A Third Memoir with reference to the Theory of the Law of Storms in India; being, RESEARCHES *relating to the Hurricane in the Bay of Bengal, and at Cuttack, from 27th April to 1st May* 1840.—*By* HENRY PIDDINGTON, ESQ.

On the 30*th April* the station of Pooree (or Juggernauth) in Cuttack, was visited by an awful Hurricane, which destroyed almost every house, Native and European. It was subsequently learnt by the arrival of the ship Nusserath Shaw, with troops on board, dismasted, that several of the ships of the China expedition, which had sailed a short time previous, had suffered, and that the storm had extended across the Bay from near the Andaman Islands, if not to the eastward of them, in about a NW. direction to Pooree. It seems also to have travelled as far as Kurnaul, inland.

Our documents for the investigation of the track of this storm, amount to about thirty logs and reports of different kinds, the which, preserving always the expressions of the writers in all that is essential, I have abridged into as small a compass as possible; and I have, as before, condensed the whole into a table at noon ; giving thus a view of the contrasts which the weather presents in different parts of the Bay, at nearly the same moment of time, the difference of Longitude being too small to require any correction of moment. I regret not having been able to add to this Memoir the logs of several of the ships of the expedition, such as the Marion, Isabella Robertson, and others; but as they have not been forwarded to me, I have thought the delay not worth incurring, as it is not possible to say when they may return to this port. Our evidence for the track of the storm will, I hope, be found tolerably complete, from its centre having on different days passed over, or close to, five ships, and to one station on shore. We are thus enabled to mark its route with greater exactness, for a longer time, and to a greater distance, than any of the preceding ones hitherto investigated. As in the foregoing Memoirs the logs and tables are followed by a summary view, stating the grounds upon which the track of the storm, the size of the vortex, and its rate of motion are laid down. The general reader, to whom the professional details are tedious, will find her I trust that nothing has been assumed without due amount of proof. The seaman can judge for himself.

Extract from the Log of the Ship " Nusserath Shaw," Capt. Edwards, bound from Calcutta to Singapore and China, with troops on board. Reduced to Civil time.

27*th April*, 1840. At midnight, light airs and fine, hot, sultry weather; wind SEbS.; at 4 A.M. EbN.; at 8, increasing; and at noon frequent hard squalls. Lat. Obs. 16° 2′ N. Long. Chron. 91° 21′ E. P.M. strong breezes ENE. to midnight, with dark cloudy weather and increasing sea.

28*th April.* Wind ENE. to noon. 7 A.M. lost maintopsail. 9 A.M. increasing gale; lost fore and main topgallant mast and head of main topmast. 10, gale increasing; lost mizen mast, boats, &c. At 11, heavy white squall. Noon, blowing a perfect hurricane; three guns lost overboard; no one able to go aloft. From 7 A.M. lying to under bare poles, with wind to the SE. Noon, Lat. account 14° 26′ 23″ N. Long. 91° 34′ E. P.M. blowing a hurricane; all the hatches battened down. Wind ENE. At 3 P.M. it shifted suddenly round to SW., laying the vessel gunnel under, with sea awfully high. Midnight, the same, and frequent squalls; vessel a perfect wreck, with all the braces, &c. gone.

29*th April.* From midnight lying to. 1 A.M. wind SSW. Noon, squally and rain. Lat. Obs. 15° 23′ N., Long. 90° 31′ E. Wind SbW. P.M. fresh gales and heavy weather, with dreadful heavy gusts of wind and squalls; sea breaking over the ship; 3½ feet water in the hold. At 8, weather as before. Midnight, less wind and sea, but ship labouring dreadfully; lying to throughout, with wind to the westward.

30*th April.* 1 A.M. Ship rolling dreadfully; still lying to. At 4, very squally, and fresh gales, with dark cloudy weather. Noon, Lat. 15· 31′ N. Long. 90° 11′ E. P.M. fresh gales with a heavy cross sea; wind SE.; bore up for Calcutta.

Extract from the Barque "Tenasserim's" Log Book, by Capt. T. Tapley, bound from Calcutta to Rangoon. Reduced to Civil time.

27*th April*, 1840. First part, light variable winds from the SSE. and suddenly shifting ENE. Midnight calm, sea smooth; last part of part of this day, strong fresh breeze eastward, smooth water.

Long. Chron. Noon,...	91° 50′ E.
Lat. Obs.	17° 40′ N.

Noon. This day cloudy; wind from the eastward; about a seven and eight knot breeze.

1. P.M. Strong breezes eastward, cloudy sky, and unsettled weather. Sunset, strong breezes and cloudy, with a threatening appearance to the eastward. At 8, made the ship snug. Midnight strong breezes from EbS½S., with a very threatening appearance; breeze gradually increasing, and coming in strong gusts and squalls.

28*th April.*—At 4 A.M. weather more threatening and a heavy sea getting up from the eastward. Daylight, wind SE. having every appearance of a gale, and blowing very hard, made all snug for bad weather. At 8, blowing a severe gale; sea at this time tremendous, battened a double tarpaulin fore and aft. Sea making a continual breach over the ship, and blowing very hard. Noon, heavy gale, ship labouring much, was obliged to keep the close-reefed topsail on her, owing to the heavy weather lurches; sea making a continued roll over the vessel; gale increasing. Sun obscured. During the whole of this twenty-four hours ship was sailing to the southward. P. M. heavy gale from SE. and varying to SSE. with a terrific sea on making a awful breach over the ship; going 2½ knots through the water up to 4 A.M. Course SbW. to SW. From 4 A.M. to noon, ship's head to NE. and ENE.; having wore round. Carried away one of the channel plates. Midnight ship rolling heavy, taking the sea in on both sides.

29th April, 4 A.M. Wind a little more moderate, but sea still continuing the same. Set reefed foresail to steady the ship. Noon rather clear, but gale still blowing hard. Wind SE.

Lat. Obs. Noon, ... 16° 32′ N.
Long. Obs. Noon, ... 91° 02′ E.

At 9, a brig passed, scudding under a foresail only, with topgallant mast on deck. 1 P.M. up foresail; a very threatening appearance to the southward. At 2-30, *wore ship to the SW., at the same time, to clear a whirlwind. By this manœuvre allowed the whirlwind to pass about* 200 *yards on the lee quarter; at this time blowing a perfect hurricane.* Wind SSE. and S. Furled every thing to a storm main trysail, and hove the ship to; torrents of rain; sea making a constant breach over the ship. At 5 P.M. more moderate; set the close-reefed topsails, and at 10-30, wore ship to the ESE. Sea still continued high, and a cross head sea, owing to shift of wind in the whirlwind.

30th April. Daylight, more moderate. Wind SSE. Wore round to the SW.; sea still running high and confused. A.M. weather clearing up a little.

Noon Obs., Lat. ... ... 16° 21′ N.
Ditto Long. ... ... 91° 50′ E.

Noon, moderate.

The phænomenon which Capt. Tapley describes in the log of the 29th, and which I have printed in italics, I thought so extraordinary that I requested of him a more particular account of it, and the following is his very graphic description of this awful addition to the fury of a tempest, which is, I believe, quite new in our naval records. A whirlwind coming down upon a vessel, lying to, in the midst of a hurricane, must, one would think, carry inevitable destruction with it,* should it fall upon her. The Freak seems to have lost her foremast in one, as will be seen by her log. Capt. Tapley says, "I have much pleasure in giving you answers to your inquiries, as nearly as I can. At 1 P.M. *30th April*, by Nautical time, (but by Civil time the 29th,) a very threatening appearance to the Southward; ship's head east, a terrific squall from the SSE. rising very rapidly, and having a very blowing appearance. When the squall was within 2 miles of the ship, perceived a heaving whirlwind flying to the NNW.; immediately wore ship to the SW., or first to the westward, to give the ship way through the water; by doing so, allowed the whirlwind to pass the ship; when passed, brought the ship to the wind, clued every thing up, and furled all. Soon after, about 10 minutes, the squall took the ship from the SSE. Ship's head about SW., blowing a complete hurricane, could not see half the length of the vessel on the water, owing to the tops of the sea being blown by the force of the wind, and a deluge of rain at the same time. I cannot remember *how** it was turning, *as we were anxious to turn out of it;* it was going round at a furious rate, and disappeared in the rain to the NNW. I do not recollect any lightning at the time.† We could not discern it until it had approached pretty close, and then the most we saw was the foaming of the water travelling up in a rapid progress. The day had been fine and a little clear for a few hours, but blowing hard. At the time this squall appeared, the sky all round assumed a threatening appearance, and squalls gathered and rose rapidly. After this severe squall, the weather kept bad during the remainder of the 24 hours."

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* Col. Reid refers to an instance of this kind, but I cannot now find the passage again.—H. P.

Extract from the Log of the Barque "Amelia Thompson" from Penang, towards Madras.

Wind.	
	Monday, 27*th April,* 1840. Civil time. P.M. Strong breezes, with heavy squalls of wind and rain.
West.	A.M. Hard gales with rain.
	8 A.M. More moderate.
	Noon. Moderate and fine.
	Bar. 29·55—Lat. Obs. 4° 14′ N. Long. 88° 18′ E.
West.	P.M. Strong breezes and squally.
WbS.	8 P.M. Heavy squalls with rain.
WSW. WbN.	8-30. Wind veered to the WNW; wore ship to WSW.
West.	*Tuesday,* 28*th April,* 1840. A. M. Ditto, weather at daylight more moderate.
WSW.	Noon. Moderate weather.
	Lat Obs. 4° 25′ N. Long. 87° 48′ E.

The Barque "Clarissa" from Penang to Madras experienced no bad weather until the 28*th of April,* 1840. At noon on that day, she was in 7° 1′ N. and 87° 56′ E.; it had been blowing hard from West to WSW. in squalls, with rain and a high sea, but did not approach to a gale. On the 29*th*, the weather became moderate, the swell high and confused.

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* † These are replies to my queries.—H. P.

The Barque "Ganges" from Malacca to Madras. On the 26*th of April*, 1840, in 6° 37′ N and 95° 56′ E. a fresh gale commenced at SSW. veering to the SW. On the 27*th* she hove to under storm staysails; the Barometer fell to 29·50, blowing a hard gale from SSW. to SW. At noon, still lying to in Lat 7° 10′ N. 95° 18′ E. Bar. 29·60. On the 28*th* the gale abated, and at noon the weather cleared up. Lat 8° 7′ N. 94° 33′ E. Bar. 29·80.

Extract from the Log of the Brig "Freak," from Calcutta to Singapore; communicated by Captain Smoult. Reduced to Civil time.

19*th April*, 1840.—Left the Pilot at the Sand Heads, and carried the wind about SSW., standing to S. Eastward. The wind then became light, and veered from SSE. to SW.; the weather continued light and variable with flashes of lightning, in the north after sunset. On the 20*th*, Lat. 20° 31′ N. Long. 88° 35′ E. On the 26*th*, Lat. 19° 23′ N. Long. 88° 40′ E. light winds, between SW. and South, with strong northerly currents until 27*th*, when the wind hauled round to the East. Lat. 18° 56′ N. Long. 88° 30′ E. P.M. Moderate breeze with fine clear weather. At 8, the wind increased, and weather became cloudy and threatening, which obliged us to take in all steering sails; the wind *moderated at midnight;* set the steering sails.

28*th April*. At 10 A.M. the breeze freshened again, took in all steering sails and royals, the Barometer standing about 29·30 steady. Lat. 17° 40′ N. Long. 88° 32′ E. P.M. strong breeze and threatening weather, *the Barometer vibrating very much,** dark heavy clouds rising in the north, wearing the appearance of ragged edges.

Commenced making preparation for a gale of wind by sending down the lofty yards, and securing spars, hatchways, boats, &c. and double gasketting the sails as we furled them. At 6. P.M. we had got every sail stowed, except the close-reefed fore topsail, the gale increasing so rapidly from NNE. that it obliged us to stow the main topsail, without reefing; the sea rising in proportion. The wind gradually veered round to the north, and blew from that quarter till midnight, (Lat. Acc. 15° 46′ N. Long. 88° 18′ East) when the wind chopped round to the NW. suddenly, and blew with double force, which threw the ship on her broadside; the helm was immediately placed a-weather, but was rendered useless, owing to the position of the ship. She lay dormant for some time, the

* The italics are mine. This *vibrating* of the Barometer is frequently noticed in the Logs in Col. Reid's work, and seems an infallible sign. In Professor Barlow's account of the water barometer it is particularly noticed as "resembling the breathings of some huge animal."—H. P.

tempest roaring with great fury, and sea flying over us in foam. The lightning mingling gave it the appearance of fire and water; the roaring of the wind prevented us distinguishing whether it thundered or not. We were soon enabled to brace the fore yard forward, which in a trough of a sea wore her before the wind, heading per compass SE. by E. directly in the trough of a tremendous sea, knocked up by the wind from North, which rendered our position most dangerous, as every sea appeared coming on board; in a short time she broached to, with her head north. The wind veering to the westward, and blowing with great fury, the ship was again thrown on her side, but being head to sea, lay much easier (the Barometer sunk to 27·25 in the gale). The foam flying so thick as to extinguish every object except at intervals; a supposed break in the sky afterwards proved to be the top of the sea!

29th April. About one in the morning, a sudden and awful gust of wind carried away the foremast. It was accompanied with a vivid flash of lightning, which enabled us to see the mast and yards carried up in the air, as if in a whirlwind, and then fall on deck with such violence that the fore yard arm stove in the fore hatchway, and went chock over into the weather wing of the ship, leaving the other arm extended to leeward. To this the wreck of the mast and other yards were attached, acting as a lever on the ship, keeping her side down. It remained thus the rest of the night, in spite of all our endeavours to cut and clear it away from the ship. The furled sails blew away by piece-meal; the quarter boat filled with water and broke away; heavy seas breaking on board, and the darkness so intense, that we could not see a yard before us; the water rushing down the hatchways, against all precaution, carried away the larboard bulwark and several stanchions, did the round house much injury, and every thing in its way; we found much difficulty in getting the crew to the pumps. Found a great quantity of water in the hold; considered it prudent to throw over some of the cargo in order to lighten the ship, as the water forced down the fore hatchway in great quantities. The wreck of the masts aft beating about in a most fearful manner, endangering the main mast, the only spar we had to work the ship with in running down to the Sand Heads. At daylight, wind SW.; the crew kept constantly at the pumps. Barometer rising very slowly, being at 27·30. Noon, sun obscure, Lat. account 16° 2′ N. Long. 88° 36′ E. P.M. wind SW. still blowing furiously, and ship labouring heavily, shipping water over all; showers of rain at intervals, hands kept constantly at the pumps, and clearing away the wreck. The same weather throughout.

30th April. At daylight loosed the peak of the main sail, hoisted it up a few feet, and hoisted the foretopmast staysail to the throat halliards, in order to keep her to the wind; this soon blew away, together with a spare jib, which was hoisted to the main stay. Constantly employed pumping. Noon a little more moderate. Lat. account 16° 41′ N. Long. 88° 0′ E., cut away the wreck from the jib-boom, which was sprung, bent a spare foresail to the mainyard and set it; got a preventer main topmast stay up, and otherwise repaired damages. Bore up for Calcutta.

1*st May*. Midnight squally with rain and thick cloudy weather, at daylight people employed setting up rigging, &c. and getting up a main topsail. Noon moderate breeze with passing clouds. Lat. Obs. 17° 26′ N. Long. 87° 47′ E. Barometer 28·30.

May 4*th*. At 4. P.M. got a pilot. During this gale, and previous to it, the following phœnomenon manifested itself; that of the clouds rising rapidly in the north, appearing ragged and black, with white feathery edges, and stretching to the southward in long tails; the sea becoming tumultuous in, and as soon as the gale reached us the atmosphere becoming very sultry. Barometer stood at noon about 29.30, or about the standard height previous to the gale, and now in Calcutta, about 29·20.*

Extract from the Log of the Brig "Vectis," R. Isemonger, Commander, bound from Calcutta to the Cape. Reduced to Civil time.

28*th April.*—At noon, fresh breezes east, and cloudy. Lat. 18° 37′ N. Long. 87° 55′E. Standing south, going 6 knots. P.M. strong breezes; dull hazy weather. At 8 P.M. preparing for bad weather. Midnight, wind ENE. blowing a gale; head SbW.

29*th April.*—1 A.M. Increasing gale, scudded; and at 6 A.M. hove to under bare poles. At 7 A.M. full hurricane and heavy sea; lost jibboom; shipped a heavy sea, which hove the vessel on her beam ends, and cleared the deck, bulwarks, &c.: Cut away the topmasts. Noon, the same weather, wind marked as *variable*†, Lat. 16° 58′ N. Long. 88° 4′ E. At 2 P.M. began to moderate. Wind marked as veering to the Northward, then to the Westward. At 8 P.M. it stood at SSW. 2 feet water in the well.

30*th April.*—A.M. to Noon, heavy cross sea. Lat. 17° 40′ N. Long. 88° 10′ E. Wind SbW. Gale continuing, and very high sea.

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* It is due to Captain Smoult to say, that this very valuable account of the storm was accompanied with a capital MSS. chart, on which the vessel's track was accurately laid down.—H.P.

† In the confusion of a small vessel on her beam ends it is probable no one could say how the wind was for some hours; or it might have been veering rapidly, and is thus marked variable.

1st May.—4 A.M. more moderate, but heavy squalls with rain. Wind SbW. Noon Lat. 18° 43′ N. Long. 88° 18′ E. Wind SSW. fresh gales and squally, bore up for Calcutta.

2nd May.—Noon Lat. 19° 54′ N. Long. 88° 29′ E.

" George and Mary;" Captain Golightly.

An imperfect account of the weather experienced by the " George and Mary," Captain Golightly, states, that upon the *28th April* at Noon, the wind veered from SW. to East with a fine steady breeze, to which all sails were set. At 6 P.M. it became cloudy, with a heavy bank to the NW. The wind shortly after shifted to North in a very heavy squall, lasting for three-quarters of an hour, to which every thing was let go, and the vessel was than prepared for bad weather. The wind continued to veer to the NW. and at daylight of the *29th*, had increased in violence. At noon of the *29th*, Lat. was *about* 16° N. Long. 84° 30′ E.* the gale being at its height, and blowing a severe hurricane from the NNW. which lasted for six hours; the wind then veered to the East, then to ESE., to S. and SSW. and at daylight on the *30th* began to moderate, leaving a " nasty cross sea."

Extract from the Log of the Barque " Flowers of Ugie" from Calcutta to the Mauritius. Reduced to Civil time.

27th April, 1840.—At noon in Lat. 19° 52′ N. Long. 89° 24′ E. at which time and till midnight, fine clear weather. Wind SE., standing to the southward.

28th April.—At noon smart breeze ESE. and clear. Lat. 19° 19′ N. Long. 88° 22′ E. 3 P.M. Bar. 29·17, breeze increasing fast from ESE. veering to East at 7 P.M. At 6, very bad appearance to the SE., reduced sail. Midnight, strong gales; Bar. 29·11. Ship going 5 knots, and standing to the SW.

29th April.—At 4 A.M. squally with rain. At 7, Bar. 28·19. At 9, gale increasing, furled every thing. At 11, very heavy gales, with heavy rain and dark gloomy weather ; hove the ship to on the larboard tack, under bare poles, wind being at NE. at 10; and North at 11. Very heavy sea breaking on board, and sweeping every thing away. Noon very bad weather, vessel straining much, and making much water. Bar 28·15. From midnight to 11 A.M., she had run 76 miles SWbS½S. Lat. 17° 15′ N. Long. 86° 43′ E. by acct. at noon. P.M. Gale still increasing, with a very heavy sea, and vessel lying nearly on her beam ends, so much so, that the pumps would not suck water. Wind NW. at 1 P.M. Bar. 28·36; At 3 P.M. wind West. At 5, SW. At 8 South, at which it continued till midnight. Bar. at 7 P.M. 28·41; at midnight 28·19. At 4 P.M. tremendous gales, with heavy rain and gloomy weather; at midnight gale abating a little.

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* This is apparently a rough guess from memory, the account being written at the Captain's request by an assistant of the house to which he was consigned, the log book being on board the ship, and the ship on its way down the river.

30th April.—6 A.M. more moderate, but at noon very heavy gales and bad weather, Lat. 17° 48′ N. Long. 86° 53′ E. Bar. 29.11. P.M. Strong gales and cloudy; saw a vessel standing to the northward with loss of foremast and mizen mast. At 9, Noon, moderate, with lightning to the NW. Wind South till midnight,, vessel lying to, head West.

1st May.—Midnight cloudy weather, wind South till noon, when moderate with fine weather, Lat. 18° 23′ N. Long. 86° 58′ by Acct.

2nd. May.—At noon in Lat. 18° 44′ N. Long. 88° 6′ East.*

Extract from the Log Book of the Ship "La Belle Alliance," Capt. Arkcoll; from Madras to Calcutta. Reduced to Civil time.

29th April, 1840.—Midnight; moderate breezes and squally, latter part a fresh gale with hard squalls and showers of rain.

28th. At 3 P.M. the Lighthouse on False Point NWbN, at 4, the lighthouse WbN; at 5-30 tacked to the SE; at 6, the Lighthouse WbS½S. and the land at WbN. At midnight tacked to the Northward; at 3-30 A.M. tacked to the E; at 5, the light WNW. At daylight, an increasing breeze from NE. and squally. At Noon an increasing gale with hard squalls, distance on the log 71 miles. Lat. Obs. none. P.M. A strong gale with hard squalls and thick hazy weather; latterly an increasing gale with violent gusts of wind. At Midnight a violent gale, with violent gusts of wind.

30th April.—1 A.M. to 5 A.M. The gale increasing, with violent gusts of wind and heavy rain; furled topsails; ship laying to under storm main staysail. At 6 A.M. ship plunging deep, with a heavy confused sea; carried away the flying jibboom; cut away the wreck. At 8 A.M. trying to strike topgallant masts; ship laying over and plunging deep could not, and obliged to cut away fore and main topgallant masts to save the topmasts; in so doing the head of the foretopmast broke above the rigging;

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* Bar. of the ship "Flowers of Ugie" at noon, 18th August in Calcutta at ten A.M. was	29·45
The Barometer at the Surveyor General's Office.	29·56
Difference to add.	0·11

This correction has been made to the Bar. heights given in the log.

a heavy confused sea. At 9 A.M. *a sudden calm,* struck main topgallant mast; ship labouring much, from the heavy sea. At 10, a violent gale from SSW. with most awful gusts of wind and heavy rain, the ship laying to under storm main staysail. At noon, gale continuing with equal violence. P.M. A violent gale, with awful gusts of wind, and a heavy sea. Moderating after midnight, with thick hazy weather. At 1 P.M. in a sudden gust of wind and rain, the storm main staysail blew away, the ship lying to under bare poles; heavy and violent gusts of wind and rain, during the day. At 2 P.M. in a heavy gust of wind, the ship labouring much, the starboard boat's davit gave way. Cut away the boat to clear wreck.—Ship lying to under bare poles. Violent gusts of wind from SSW. with heavy rain and thick hazy weather during the night.

1*st May.* At 5 A.M. the weather moderating, set close-reefed topsails. At noon the weather moderating and the sea going down; thick hazy weather.

30*th April,*	10	P.M.	Bar. 29·40
	12	......	...... 29·20
	3	A.M.	...... 29·00
	5	......	...... 28·10
	8	......	...... 28·30
	12	......	...... 28·60
1*st May,*	4	P.M.	...... 28·90
	9	......	...... 29·10
	12	......	...... 29·30

Lat. Obs. 19·19 N.

The first of the gale was from the NE., and at 11 A.M. on the 30*th,* it suddenly shifted to the southward, and blew if any thing heavier than before.

I am indebted for this extract, which is so highly interesting, as marking the direct trask of the storm towards Pooree (Juggernauth) to Capt. Biden, Master Attendant of Madras, but I could not obtain a sight of the ship's log while at Calcutta; so that her exact position at the time of the shift of wind, is not so certain as it might have been; neither could I obtain a comparison from her Barometer.

Abstract of the Log of the ship "Christopher Rawson," Capt. Smellie. Reduced to Civil time.

On the 27th, exchanged numbers with the Marion, Capt. Pope, in Lat. 17° 15′ 30″. N. *Bar.* 29·80; the Bar. down 4 lines, and the weather very oppressive. Light SSE. winds and sultry. Barometer falling fast.

28th April. Midnight, heavy gathering clouds in the SE. and threatening look. At 10 A.M. a very heavy squall from East; I consider this the commencement of the gale; the scud flying in confused masses, and a number of sand birds on the rigging. At noon, heavy appearance of weather. Lat. Obs. 19° 29′ 15″ N. Bar. 29·40. P.M. Blowing fresh from E. and ESE., the Barometer 29·35, and every appearance of worse weather; making a bold push for the Pilot. Midnight and until day-dawn, constant heavy squalls and much heavy rain.

29th April. At 4 A.M. sounded in 17 fathoms; at 5 sounded in 10 fathoms, and by two excellent Chronometers made the Outer Floating Light bear from us due west 15 miles distant; finding the sea too high to receive a pilot close-reefed the top sails and courses; under this sail stood out South; wind abeam at East, gale increasing and the sea rising fast. At 10 A.M. *a tremendous sea spread from the SSW.* and a heavy ground swell on our beam East; preparing for bad weather. At noon gale very heavy, no sun, suppose ourselves SSW. from the Floating Light, distant 30 miles.

Gale increasing at ESE. and East in the heavy squalls; a very high confused sea often breaking over all. At midnight sprung fore yard; sounded in 30 fathoms.

30th April. 2 A.M. Blowing a hurricane, sprung our main mast in the deck partners; the sea washing away our large cutter, davits and all, and making a clear breach over all; both pumps going. The wind SE. and veering round gradually to the southward. At day-dawn observed some broken spars and short pieces of plank passing us; shipped a heavy sea, broke the lashings of the skylight, which unshipped, and nearly filled our cabin with water. Noon., Lat. Obs. 20° 28′ N. A heavy sea struck the ship aft, and injured our rudder head. Bar. 28·80.

Bar. 28·90; gale continues heavy; ship under bare poles, lying in the trough of the sea, very uneasy. Wind SSE., ship's head SWbW. Having blown our storm staysails away got a bolt of new canvas in the mizen rigging.

1st May. At day-dawn ship on her beam ends, and the sea making a fair breach over all; the water much discoloured; sounded in 16 fathoms on the edge of Point Palmiras Reef, the wind suddenly shifting into the SSW. wore ship to the SE. Sun obscured at Noon; no vessels in sight.

Some attempts at a clear-up; ship lying helpless in the trough of the sea; Bar. rose 4 lines. At 2 P.M. set the close-reefed topsails. Sunset clear weather, but destructive sea, midnight heavy squalls from SW.

2nd May. Day-dawn, moderating fast. Out reefs, and stood to the WNW. At 7 sighted a Pilot vessel. At 8° 30′ obtained a pilot. From our position on the commencement of the gale, I supposed myself in the centre of the Bay during the worst part of it, and allowed 36 hours drift under bare poles before I looked for shoal water. My astonishment was great at finding the ship, early on the 1st, in 16 fathoms on the reef; and I can only account for it by supposing the easterly gale had caused a current, or set, to the westward of at least 4 miles per hour; which may perhaps account for so many vessels getting over on the Point, as I had the advantage of 15 miles easting at its commencement.

Balasore.

A letter from Balasore, dated 4th inst., says :—

"We have just escaped a severe hurricane; it blew very hard on the night of the 30*th*, and the tide rose very high, but luckily the wind did not last long enough to drive the sea over the country. At Pooree they have felt the hurricane most severely. I hear that all the houses and the Government Cutcheries have been blown to the ground, and much damage has been sustained; great part of the native town has been destroyed, and several lives lost. When the circuit house fell, two men were buried, and escaped with broken legs. Pooree is full now, the gents from Cuttack having gone there to enjoy the cool breeze; they and the residents took refuge in the only house which stood the storm: the description of the scene is fearful. Mr. Ewart lost his Arab horse, buried in the ruins of the stable. The natives declare that Juggernauth's august presence alone prevented the sea from washing away the town. The storm was felt at Cuttack also severely, and I much fear it has been destructive on the whole line of coast. This is a true version I think, and you may perhaps like to give the readers of the *Englishman* the news."—*Englishman, 7th May,* 1840.

Report from Captain A. Bond, Master Attendant, Balasore.

29th April, ...	Bar.	29.66	Ther.	85°	NE. Rain and squally,
30th Ditto, ditto, ...		29.57	ditto,	82	NE. Rain and puffy,
1st May, ditto, 8 A.M.		29.25	ditto,	81	E. Strong gusts of wind,
Ditto, 1 P.M.		29.43	ditto,	82	NE. and East.

On the 1*st May,* A.M.; at Balasore; strong gusts of wind, with continual rain, inclining to a gale till 8 A.M., when the wind veered from NE. to South, and cleared up at SW. at 9 A.M.

At Budruck, 32 miles WSW. of Balasore, the wind stronger, with flying clouds to the SW.

I was at Budruck on the morning of the gale, and from the log kept here, it was very similar to the one I kept there, in every respect.

The strength of the gale was felt more southerly at Pooree; and inland the rain appears to have been heavier, and the wind less.

The May gales have not affectd Balasore since May 1823. No vessels lost on the coast; several put into Chooramoon in distress.

A. Bond.

I am indebted for the following letter to Mr. Ewart, Magistrate of Pooree.

Your letter to Mr. Cumberland has been handed to me. During the storm, and for some weeks, Mr. Cumberland had been very unwell, and had ceased to keep a Meteorological Register. At the time of the storm, I and two other gentlemen were staying at our house. On comparing notes next day, we discovered that we differed in one material point, viz. which way the storm went round.

To the best of my remembrance, the South-west wind, which generally blows so steadily during part of February, March, April, May, and part of June, failed and became variable, hanging between South and East. The sky was very cloudy, and on Wednesday, 29th April, there were showers. On Wednesday afternoon the wind was very strong from NbE.; the rain and wind continued to increase during the night from ENE. On Thursday morning, 30*th April,* at daylight, it was blowing strong, but people went about their ordinary avocations. By 10 A.M. there was a gale from NE. At noon I went on my elephant to visit the various ladies who had come with their families, but without their husbands. The wind was so violent and gusty, that I found it necessary to hold fast by the pad-ropes, and the drifting rain and sand frequently made the elephant stand, and refuse to proceed. From 8 A.M. on Thursday, 30*th,* the rain was incessant. The wind continued to blow, with about the same violence, after 10 A.M. till evening from the North-east. It then veered to nearly North, and after hanging between N. and NE., at about 7½ P.M. *entirely lulled.* About 8, what we imagined the ordinary monsoon breeze began to blow from SW.; it however increased, and got round to nearer the West. By 9½ P.M. it blew from WSW. with far greater violence than it had from the other direction. Many houses had lost a portion of the thatch by the NE. wind, but almost all were destroyed by the West wind. It began to abate about 4 A.M. on Friday 1*st. May;* there were occasional gusts during the morning from SW., but our usual breeze blew pretty regularly; my impression was, that just before the lull on Thursday evening the wind was at NW. and went by the East to SW. This struck me particularly, because it was contrary to the received theory.

I fear this is a very vague account, but it is the best I can give.

Pooree,
30*th May*, 1840.

James K. Ewart.

NOTE.—It will readily be seen by those to whom the Theory of Storms is familiar, that the centre of the hurricane, as here described, must have passed over, or a very short distance to the South of the station. The discrepancy of opinions mentioned might easily occur at such a time, amongst gentlemen who were not seamen, and it is more than probable, that, at the centres of storms and near them, counter currents and eddies do occur; and that their changes are almost instantaneous; the main change was from about NNE. to SW. and at the centre this might have happened either way, without affecting the truth of the theory. H. P.

THE GREAT STORM IN ORISSA.

[*From a Correspondent at Pooree.*]

" On Thursday, the 30*th April*, one of the most violent storms ever remembered in Orissa visited the station of Pooree, and surrounding district. The wind blew very fresh from the North-east early in the morning, and towards the middle of the day increased so much, as to make every one take precautions to guard against its violence. The surf was unusually high and roaring, and approached the bungalows much nearer than was at all pleasant. Out-offices were levelled, and clouds of sand buried every thing. About 6 o'clock in the evening the wind lulled, when it was hoped that the worst was over, but the disasters of the day were as nothing in comparison with what the night brought. The wind suddenly shifted round to West and South-west, and recommenced in all its fury. Every one sat waiting for the worst, running from one room to another, as the house gave way, and when the general crash came, it was fearful.—The wind and rain so boisterous, that no one could stand erect exposed to them. Ladies then escaped to their palkees, anxiously awaiting the break of day. The darkness of the night totally prevented any communication of one house with another, and it was not until morning that the whole truth could be known. Alas! every bungalow in the station has been destroyed—not one is there that can possibly be inhabited. One solitary puckha-house stood the buffetting of the storm, as it would appear, intended as a refuge for the destitute. It was most providential that some families deserted their own houses during the afternoon and took shelter in any secure place they could find; for had they remained they must have perished. Entire roofs and walls came to the ground, other houses went piecemeal, rafters and thatch coming down, and some have disappeared altogether. Some ladies were obliged to desert their bungalows, and remain in their palkees on the sands the whole night. In fact, no one has escaped, and many have lost every thing they possess. The drift of the sand was so great, that every thing was buried several feet in it, and a most difficult task it has been to recover property so embedded. The ruins of the houses are almost unfit for repairs, except under a cost equal to the original expense of building, and the whole coast presents one scene of destruction. The city has suffered to a great extent; indeed every house has been blown down, but the immortal remains of Juggurnauth lie undisturbed in his celebrated temple. The surrounding villages have been equal sufferers, and a camp belonging to the revenue surveyor, about 20 miles distant, was totally destroyed. Large trees strew the road, and many lives have been lost in consequence. One family, of eight persons, were crushed under one tree; but the loss of life has been much less than could have been expected. I have not heard of more than forty altogether; but accounts may be brought in hereafter. Altogether the scene has been one I never wish to witness again, for independently of the great pecuniary loss, it has been an awful visitation, which those who have lived and experienced can alone comprehend. POOREE, 3*rd May,* 1840."—*Englishman.*

Extracts from the Log Book of the Barque "Elephanta," of Greenock; from Clyde to Calcutta. Reduced to Civil time.

April 28*th.* Bar. 29·60. From midnight to 8 A.M., wind SE. to EbS. fresh breezes, and cloudy; a heavy swell from the SW. From 8 A.M. till noon, light winds and cloudy. At noon Lat. Obs. 15° 20′ N. Long. Chron. 84° 29′ E. The same till midnight.

29*th.* NE. fresh breezes and cloudy weather throughout; *a heavy swell from the Eastward;* the current has set the ship EbN. 20 miles these 24 hours. At noon Lat. 16° 24′ N. Long. Chron. 84° 22′ E. P.M. light winds and cloudy weather.

31st. A.M. Fresh breezes from SW. and cloudy, *with a great swell from the* NE.; the ship labouring and pitching very heavy. At Noon, cloudy, the land in sight bearing WbN. to NbW. supposed to be the Dolphin's Nose. At Noon, by very indifferent Obs. Lat. 17° 46′ N., Long. Chron. 84° 28′ E.; to midnight, moderate and fair.

1*st May.* A.M. SSW. Fresh breezes and cloudy; a swell from the SW. At Noon Lat. 18° 48′ N., Long. Chron. 85° 40′ E. P.M. moderate breezes and hazy weather.

Extract from the Log of the Schooner "Amelia," Captain Ross. Reduced to Civil time.

The "Amelia" was off the Sand Heads when the last gale commenced. Unfortunately during the gale the Barometer was injured, which prevents any correct information on that head, further than that it fell two-tenths the day previous to the gale.

29th April, 1840. At midnight, winds easterly, with light passing squalls. Outer Floating Light bearing EbN. 6 A.M. Wind easterly. Being now to the eastward of the Western Sea Reef, breeze increasing with heavy appearance to windward. Pilot apprehensive of bad weather, recommended standing to sea; stood to the South-eastward. Noon, winds ENE. blowing very hard and sea rising. P.M. winds ENE. increasing to a gale. Midnight, ditto, blowing a hard gale and heavy sea.

30th April. 6 A.M. Ditto as before, blowing with violence, and squalls with rain. Noon, ditto weather; shipping much water on deck; soundings in 62 fathoms. 6 P.M. wind east with heavy appearance to the south-eastward, with occasional heavy rain and hard squalls. Midnight, wind SE. with increased violence, now blowing with great fury. Our sails were blown out of the bolt ropes. *A cross turbulent sea rising in pyramids, and breaking over the vessel, while the force of the wind depressed her lee bulwarks under water.** Soundings in 45 fathoms.

1st May. 6 A.M. Wind veering southerly, still blowing with fury and a great sea. 8 A.M. Wind SW. rather more moderate. Soundings in 20 fathoms. Wore to the Eastward. Noon, wind SW., gale abating. Found by Obs. that our situation is 15 miles to the southward of False Point in 22 fathoms; bore up for the river.

The two days previous to the gale, we had the wind from the South-eastward, light, with hazy weather, hot and sultry.

The gale commenced from the North-eastward, veering to the Eastward and South-eastward, at which point it blew with the greatest violence, and began to break up soon after it reached the South-west point.

During the gale the heaviest appearance of the sky was to the SE. and Southward. The upper clouds appearing to move N. and NW.† even while the wind was NE.

Extract from the Log of the H. C. F. L. V. "Beacon," C. Hudson, Commander.

April 29th, 1840.—A.M. Fresh SE. breeze and cloudy. 4 A.M. Breeze increasing; veering to ESE. cloudy unsettled weather. Daylight, increasing breezes at ESE. and cloudy unsettled weather, heavy sea. 8 A.M. Fresh breezes at Eastward, cloudy unsettled weather. Noon, strong breezes at East, veering to NE. with heavy squalls of wind and rain, threatening appearance. Noon to 4 P.M. blowing in heavy gusts from E. to NE. and ENE. heavy passing showers, and dark, cloudy, threatening appearance all round. Sunset, blowing hard at ENE. with passing showers, and very threatening appearances to the SE., heavy sea. 8 P.M. Blowing hard at ENE. with passing squalls and light showers, with dark cloudy threatening appearances all round. Midnight, moderating, ENE. breezes and cloudy unsettled appearances to the Eastward.

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* This is an instance of the possibility alluded to in p. 46 of my first Memoir, (p 645 Journal As. Soc. for August 1839.) If the shift of wind had been sudden, the vessel would have been laid down against the whole fury of the waves.

† This is somewhat equivocal, for it may mean *to* the N. and NW. or *from* the N. and NW. The observation is nevertheless important.

30th April. A.M. Strong breezes at East, with dark, cloudy, unsettled weather. Daylight, blowing hard at ESE. with very threatening appearances all round, and a heavy cross sea. 8 A.M. Strong breezes at ESE. and dark, cloudy, unsettled appearances to the eastward. 8 A.M. to Noon. wind veering from ESE. to East, with continual heavy squalls, and heavy rain, dark dismal clouds, and very threatening appearances all round, with a confused sea. 4 P.M. Strong breezes at East and EbS. with dark cloudy, unsettled weather. Sunset, strong breezes, veering from East to EbS, with dark dismal clouds, and threatening appearance to the SE. with heavy sea. 8 P.M. Strong breezes veering to SE., with dark dismal clouds and unsettled, with threatening appearances all round. Midnight, fresh breezes veering from SE. to SSE. with heavy passing squalls of wind and rain; unsettled appearances and lightning to the Southward, with distant thunder.

1*st May*, 1840.—A.M. Blowing very hard in squalls at SSE. dismal threatening appearances and passing showers, with very heavy sea. 4 A.M. Wind increasing to a gale at SSE. with a very heavy sea. Daylight, blowing a gale at SSE. with dismal threatening appearances. 8 A.M. Gale increasing at SSE. with very threatening appearance, and very heavy sea. Noon, blowing a heavy gale at SSE. very threatening appearance, sea still continuing. 4 P.M. Gale still continuing very heavy, weather clearing up a little; sea still continuing heavy. 8 P.M. Moderate breezes veering to SbW. and SSW. with passing squalls of wind and rain, and unsettled weather, with lightning to the SW. Sunset, moderating a little, and wind veering to Southward and SbW. with passing squalls of wind and rain, sea continuing. Midnight, blowing hard at SSW. and SW. with heavy passing squalls of wind and rain, with dark cloudy weather all round, and lightning to the SW.

Mr. Hudson adds the following remarks. " As the variation of the wind and the appearances of the weather, were correctly stated during the gale, the only remarks I have to make thereon, are, that in every gale I have experienced here, it has invariably began at the Northward, veering to the Eastward, sometimes as far as North-east and back again,* generally breaking up at SW.; the heaviest part of the gale generally being between SE. and South, except the last, the heaviest of which was at WSW., the point at which it broke up."

* So in the MSS.

Extract from the Log of the H. C. L. V. "Hope;" Eastern Channel. W. Clark, Commander.

Date.	Winds and Weather.	Bar.	Ther.	Remarks.
Wednesday, April 29th, 1840.	A.M. Fresh Easterly breezes, dark, cloudy threatening weather, and lightning,			H. C. L. V. Hope Eastern Channel lying at Anchor 140 fathoms cable.
	3 A.M. Heavy gusts from the Eastward, and passing squalls.			
	Daylight. Strong Easterly breezes and ditto weather.			
	8 A.M. Fresh breezes and cloudy, with passing squalls and rain.	29·67	81·	
	Noon. Strong Easterly breezes and ditto ditto weather; rain at times.	29·65	81·	
	Sunset. Ditto winds and weather.			
	8 P.M. Ditto winds and weather.	29·65	81·	
	Midnight, heavy passing squalls from the Eastward, and ditto weather.			
Thursday, April 30th, 1840.	A.M. Heavy squalls from Eastward, and threatening weather; passing squalls and very heavy sea on.			140 fathoms cable.
	Daylight. Strong East to ESEasterly breezes, cloudy and squally weather.			
	8 A.M. Ditto cloudy, and threatening appearances all round.	29·60	81·	
	Noon. Strong ESEasterly breezes and ditto weather.	29·60	82·	
	Sunset. Blowing hard from East to ES. Easterly, with passing squalls and rain.			
	8 P.M. Blowing hard at SE. Ditto weather.	29·55	81·	
	Midnight. Ditto from SE. to SSE. and ditto weather.			
Friday, May 1st, 1840.	A.M. Blowing a moderate gale at ESE. with heavy gusts at intervals, and rain; weather still threatening; shipping much water.			200 fathoms cable.
	Daylight. Gale increasing at SE. battened down the hatches and made all snug; veered to 200 fathoms cable.			
	8 A.M. gale still continuing at SE. with frequent squalls and rain.	29·50	81·	
	Noon. Moderating a little, veering to the southward, frequent squalls of wind and rain, and heavy sea on.	29·53	83·	
	4 P.M. Decreasing at SSW. very unsettled appearances all round; very heavy sea on.			
	Sunset. Strong SSWesterly breezes, with cloudy and threatening appearances all round.			
	8 P.M. Ditto ditto weather.	29·67	81·	
	10 P.M. Wind shifted suddenly round SSW. to NW. with threatening appearances and much lightning.			
	Midnight. Light variable breezes from NW. to SW. cloudy and threatening appearances to the Westward, and rain.			

Tabular View of the Gale of 29*th April, to* 2*d May,* 1840, *at the Pilot Station off the Sand Heads.*

Date, Civil time.	Names of Vessels.	Situation.	Winds, Weather, and Remarks.
April 29th, 1840.	Megna, H. C. P. V.	At anchor 18 fathoms Western Sea Reef.	On the 28th Light breezes from SE. to ESE. First part, wind ENE.; middle and latter East, blowing hard. At daylight squally, and stormy appearance to the Eastward, wind from ENE. Strong Easterly breezes with rain in the evening, and a heavy sea. Bar. fallen to 29·54 at 7-30 P.M. Veered to 90 fs. cable.
	Cauvery, P. V. ..	At anchor 17 fathoms off tail of the Western Sea Reef; South Channel Buoy, NE$\frac{1}{2}$E.	On 28th. Fine; wind from SE. to ESE. First part of this day fresh breezes ESE. to ENE. Latter E. to SE. with hard squalls and heavy rain, riding 160 fathoms.
	Seahorse, P. V. ..	At anchor off Northern part of Point Palmiras. 20 fathoms, dark sand.	Strong breezes ENE. to East, and very squally. Vessel labouring much, riding with 120 fs. cable.
	Coleroon, P. V. ..	At anchor Eastern Channel; Floating Light EbS$\frac{1}{2}$S. 1$\frac{1}{2}$ miles. ..	First part moderate Easterly winds. From 8 A.M. to midnight hard squalls from NE. to ESE. with rain and heavy sea.

N. B. The week preceding moderate, and fine weather. Winds from SW. to SE. On 28th winds variable from ENE. to ESE. and weather fine.

Date, Civil time.	Names of Vessels.	Situation.	Winds, Weather, and Remarks.
30th April 1840.	Megna, P. V. ...	At anchor Western Sea Reef.	Strong gale from the Eastward, heavy squalls. At daylight, heavy squalls and rain from ENE. and very stormy appearance; vessel labouring much. At Noon. Wind rose to a gale from the Eastward. Blowing in heavy gusts with rain. 10 P.M. Increasing, veered to 125 fathoms, then blowing a hard gale and very heavy sea running; vessel shipping much water. Midnight. The wind hauled round to East, still blowing hard.
	Cauvery, P. V.	At anchor as before, 17 fathoms. ..	First part moderate from ESE., latter fresh gales from SE. to SSE.
	Seahorse, P. V....	At anchor off Northern part of Point Palmiras, as yesterday.	Fresh gales ENE. to EbS. with heavy rain; 160 fathoms cable. 4 P.M. gale increasing.
	Coleroon, P. V....	At anchor Eastern Channel Floating Light EbS½S. 1½ miles.	First part hard squalls from ESE. Noon; more moderate, latter. 8 P.M. hard squalls SE. to SSW. with lightning and rain. At 10 P.M. blowing a gale at SEbE. and to midnight the same.

Date, Civil time.	Names of Vessels.	Situation.	Winds, Weather, and Remarks.
1st May, 1840.	Megna, P. V. ..	At anchor Western Sea Reef. ..	Wind, first part, from ESE.; middle, SE.; latter, South. At daylight still blowing a hard gale from ESE. but with a clearer appearance. Noon, began to lull; wind SE. At 4 P.M. wind abating. At Sunset, hauled to South.
	Cauvery, P. V. ..	At anchor as before; drifted into 11½ fathoms on the Western Sea Reef.	A.M. Fresh gales from SSE. to SW. P.M. Moderating from SW. with a squall from WNW. and rain. At 8 A.M. driving on Western Sea Reef with 160 fathoms. Let go a second anchor. Noon, blowing a fresh gale from SWbS. shipped a heavy sea and carried away the tiller. 8-30 P.M. Moderate from SW. Midnight, wind moderate from SW. and cloudy.
	Seahorse, P. V. ..	At anchor off Northern part of Point Palmiras, as before.	Fresh gales ESE. to SSE. with heavy rain at intervals. At 1 A.M. driving. At daylight driving again; 200 fathoms cable. Noon, gale moderating; wind SSE. to SSW. Midnight, moderate.
	Coleroon, P. V. ..	At anchor as before.	Early part a gale from SEbE. Towards morning increasing gale from South, with a very heavy sea. At 10 A.M. gale veered round to SW. shipping heavy seas; riding with 150 fathoms. P.M. gale moderating. Midnight, moderate; SSW. to WSW.

Schooner "Margaret," Capt. Thaddeus; proceeding up the River.

28th April, 1840. *Civil time.*—Noon. Lat. 20° 45′ N. Long. 88° 32′ E. 55 fathoms, soft mud. P.M. Fresh breeze ENE. At 9, NE. cloudy, and lightning from SE. and East at midnight.

29th April.—Noon. Strong breeze and cloudy; working up. P.M. Small rain. P.M. ENE. and at 5, NE. Midnight; strong breeze NE. and threatening gloomy weather, with drizzling rain.

30th April. Wind ENE. At daylight threatening. Noon, passed Diamond Harbour, midnight hard squalls. At anchor off Wollooburrya.

1st May. A.M. ENE. Wind fresh breeze and rainy, cloudy and threatening at daylight. At 8-30, wind SSE. strong breeze. Noon, heavy gales. 4-30. P.M. Wind South. Midnight, heavy gale with small rain. At anchor half way between Wollooburrya and Calcutta.

2nd May. A. M. Wind South. Strong gale with small rain; arrived at Calcutta. P. M. SSW. Wind, with rain.

At Calcutta,

the following are my own observations. The Barometer is corrected to the standard at the Surveyor-General's Office.

29th April, 1840. *Civil time.*—At 8 A. M. Bar. 29·74. Squalls from the NE. During the day close sultry weather, calms and light squalls at times from NE. with drizzling rain. At 7 P. M. Close and sultry, drizzling rain and light airs from the NE. with cloudy, gloomy, weather all round. Bar. 29·67. During the night, gloomy weather, with light breezes, from the E. and NE.

30th April.—The same weather continuing. At noon squalls and drizzling rain from East and ENE. Bar. 29·64. Calms and heavy rain to 4½ P. M. Bar. 29·57. Evening and to midnight, light airs from the East, dark gloomy weather, and drizzling rain at times.

1st May.—From midnight to 6 A. M. dark gloomy weather, with light breezes and squalls at times from East and ESE. At 6 A. M. Bar. 29·52. A squall from the SE. with heavy rain: scud flying fast from the SE. 10½ A. M. Bar. 29·52. Strong breeze SE. with squalls. Noon. Bar. 29·47. A gale with heavy squalls SE. to ESE. with heavy rain, 3 P.M. Bar. 29·39. Gale in heavy squalls, from SSE. 4½ P.M. Wind S. (gale) with frequent squalls, Bar. 29·39.

5½ P. M. The same. Bar. 29·40. 6½ P. M. SbW. Heavy dark scud and squalls. Bar. 29·42. 7½ Sudden squalls and lulls between them, from SSW. and SW. Bar. 29·45. 9 P. M. The same; squalls hauling to SW. Bar. 29·52.

2nd May.—5 A. M. Bar. 29·58. Fine weather.

I have inserted the following report on the principle, that no knowledge should be, in the present state of the inquiry, set aside; but I do not think it has much relation to our present subject.

Report from the Collector of Coringa to the Government of India.

"As it may enable the gentleman who has undertaken to investigate the course of storms, to fix with some accuracy the extent to which the late gale of the 30th April and 1st May reached, I have the honor to forward an extract from the Log just received from the Coringa Lighthouse from 6 P.M. of the 1st ultimo, till midnight; when the wind died away. This squall appears to have been the tail of the storm, and did not, I should think, extend much farther along this coast. The weather for two or three days before had been very threatening, and I understand the Barometer fell to a considerable extent, but as the instrument for the Lighthouse has not yet been received from Madras, I regret that I am unable to furnish you with a more accurate report."

"G. SMITH."

Extract from the Log kept at the Lighthouse at Coringa.

Hours.	Winds.	Remarks on Friday, 1st May, 1840.
6 P.M.	SW.	Wind moderating, and a squall brewing in the NW.
7.	"	The squall, with thunder and lightning, commenced blowing from this quarter with a smart shower of rain.
8.	Westerly,	
9.	SW.	
10.	"	Blowing very fresh.
11.	"	
12.	"	Wind moderating, weather clearing up.

The Brig "Union," from Coringa to Pondicherry. Forwarded by Capt. Biden, Master Attendant, Madras.

On the 30*th April*, when she was at Noon in Lat. 14° 19′ N. Long. 82° 15′ E. had smart breezes from SW. amounting to strong gale, and high sea. At midnight, wind South, strong gales with dark gloomy weather, and a turbulent sea, laid to under bare poles.

1*st May*. At 3 A.M. wind SSW. Daylight, moderating; made sail, wind SWbS. and SSW. till noon, when fresh breeze and hazy weather. Lat. 14° 49′ N. Long. 81° 18′ E. P.M. moderating, but towards, and at, midnight increasing again to fresh gales SbW. to SSW. and high confused sea.

2*nd May*. Wind SW. to SE. at noon, when it moderated to light airs from that quarter. Lat. 14° 26′ N. Long. 80° 15′ E.

Extract from the Log of the Barque "Sarah," from Vizagapatam towards Madras. Reduced to Civil time. Forwarded by Captain Biden, Master Attendant, Madras.

30*th April*, 1840.—P.M. Fresh breezes SW. to 7 P.M., veering to SbE. at 7 and South at 8, with cloudy weather till midnight.

1*st May*.—At 2 A.M. hard gales SW. veering to NW. at 4, and again to SSW. At 7 heavy lightning, split several sails. At noon moderating, Lat. 13° 25′ N. Long. 82° 47′ E. Bar. 29.56. P.M. Wind SbE. fresh breezes and cloudy, till midnight.

Extracts from the Meteorological Journal kept at the Madras Observatory.

Date,	Barometer.			Thermometer.		
	8 A.M.	4 P.M.	10 P.M.	8 A.M.	4 P.M.	10 P.M.
1840. April 26th.	29.776	....	29.766	86·0	....	87.3
27th.	29.720	29.614	29.706	86.3	91.0	89.7
28th.	29.700	29.628	29.720	86.4	90.0	88.4
29th.	29.680	29.605	29.684	87.2	91.3	89.2
30th.	29.680	29.568	29.680	87.9	99.0	89.8
May 1st.	29.720	29.643	29.798	88.3	93.0	86.5
2nd	29.820	29.750	29.858	86.0	89.0	87.8

The following table is extracted from a Meteorological Register kept at Chuprah, by Mr. Ravenshaw of the Civil Service.

April	24	29·64	87½	29·57	88½		East variable } 4 P.M. NbW.
	25	29·54	88	29·36	88¾		Variable. } Do. Do, Gale from E. at 6½ P.M.
	26	29·48	86	29·46	87½		Strong Gale from E. all night, to present hour 10 A.M. accompanied with clouds, but no rain. At 4½ still blowing from E., but more moderate. At 10½ P.M. still blowing; fresh Gale all night.
	27	29·52	86	29·48	87½		Ditto, 4½ P.M. E. fresh more moderate.
	28	29·56	87½				Gale continues.
	29	29·62	87½	29·56	88		Strong wind but variable ENE. cloudy, at 4½ E. moderate.
	30	29·56	88	29·52	88¾		East moderate Do. fresh.
May	1	29·53	86	29·53	86	N. B. (SE. Gale at Calcutta,)	N.E. blowing fresh cloudy. 4½ P.M. squall at NbE. rain
	2	29·53	83	29·50	84		Variable, rain all night. Do. Cloudy, sky overcast.

Memoranda from Dadoopoor, Kurnaul, and Hansie, of a storm which occurred at those places on the evening of the 4th May, 1840; *forwarded by Lieut. Baker. Dadoopoor. Report of Mr. W. Dawe, Delhi Canal Department.*

On the 4th (the day of the storm), the wind had been blowing strong from the Eastward all day, but about 7 P.M. heavy clouds appeared in the SW. to West quarters, with thunder and lightning. The storm came on at 7 hours, 45 minutes, from the southward of West. But by 8 P.M. it had settled at North-west, and continued to blow steadily till about 9 P.M. with a few drops of rain. From this period till 10 P.M. the thunder was heavy and continued, and the lightning vivid. But the wind came in sudden and heavy gusts, which has done much damage to the trees, &c. As the crops had been cut, by the appearances after the storm had subsided it might have been concluded that it was only one of usual occurrence; but as good sized trees have been broken short off, this proves that it was otherwise.

By reports from the Deyrah Dhoon, and Saharunpoor district, it appears the storm has been as severe at those places also.

DADOOPOOR, 14*th May*, 1840.
WILLIAM DAWE, *Conductor.*

Copy of the Meteorological Register kept at Dadoopoor, for the first week of the month of May, 1840.

Dates.		Observations day-break.							Ditto at 10 A.M.									Ditto at 4 P.M.							Ditto at 10 P.M.									Remarks.
			Thermometer.									Thermometer.							Thermometer.									Thermometer.						
		Barometer.	Attached.		Detached.		Wet bulb.		Rain Gauge.		Barometer.	Attached.		Detached.		Wet bulb.		Barometer.	Attached.		Detached.		Wet bulb.		Rain Gauge.		Barometer.	Attached.		Detached		Wet bulb.		
May, 1840.	1	28·526	68	,,	67	,,	65	,,	,,	,,	28·725	95	,,	94	,,	81	,,	28·620	103	,,	102	,,	86	50	,,	,,	28·602	79	,,	78	,,	74	,,	Clear, light, variable wind.
	2	28·540	70	,,	69	,,	66	50	,,	,,	28·636	96	,,	95	,,	80	,,	28·590	103	,,	100	50	83	50	,,	,,	28·622	80	,,	78	,,	72	,,	Clear, light, variable wind.
	3	28·660	80	,,	79	,,	73	,,	,,	.,	28·766	92	,,	91	,,	80	,,	28·766	100	,,	99	,,	80	,,	,,	,,	28·652	83	,,	82	,,	79	,,	Clear strong easterly wind.
	4	28·540	77	,,	76	,,	74	,,	,,	,,	28·702	92	,,	91	.,	83	,,	28·544	100	50	100	,,	87	,,	,,	,,	28·624	74	,,	72	,,	70	,,	A.M. Clear strong easterly wind. P.M. a storm from W. to N.W. with rain.
	5	28·576	73	,,	72	,,	67	,,	,,	50	28·694	88	,,	87	,,	78	,,	28·614	91	,,	90	,,	80	,,	0	03	28·662	75	,,	74	,,	69	,,	A.M. Clear, light, easterly wind. P.M. Squall, easterly shower.
	6	28·712	69	,,	68	,,	66	,,	,,	,,	28·828	83	,,	83	,,	74	,,	28·786	92	50	92	,,	78	,,	,,	,,	28·790	78	,,	77	,,	70	,,	Clear, light, easterly wind.
	7	28·742	68	,,	67	,,	66	,,	,,	,,	28·828	86	,,	85	.,	75	,,	28·736	95	,,	94	,,	75	,,	,,	,,	28·742	79	,,	78	,,	73	,,	Clear, strong, easterly wind.

Kurnaul. Lieut. Baker's Report.

We had westerly winds at Kurnaul on the 1st and 2nd instant; and on 3rd and 4th, a strong breeze from the Eastward, and 3 or 4 P.M. on the 4th, a heavy bank of clouds appeared to the westward. About sunset we had frightful gusts of wind from the West, North and North-east, the air during the intervals being sultry and oppressive.

About 8¾ P.M. the sky became entirely overcast, and a violent squall of wind began to blow from the Westward, accompanied by clouds of dust, and latterly a few drops of rain. The wind continued to blow from the West with more or less violence for about two hours, when it gradually went round to the East, from which quarter it continued to blow till 2 P.M. on the 5th, when it was interrupted by a second (less violent) squall, from the Westward, accompanied by a slight shower of rain.

The strength of the wind during the first squall must have been considerable, as it unroofed many out-offices at the station, and blew down many hundred trees on the Canal banks.

Hansie. Report of Mr. T. Johnson, Delhi Canal Department.

I have the honor to report, agreeable to the Government Notification dated 11th September, 1839, that this station was visited by a storm of wind and dust on the evening of the 4th May, 1840.

The storm commenced at ¼ past 8 o'clock P.M. from the NW. the wind blowing in strong gusts, bringing with it dense masses of dust; its duration was for ¾ of an hour, when the wind veered round to the NE. and continued to blow a stiff breeze from that point nearly all night, unaccompanied by dust. There were masses of clouds with much lightning passing along the northern horizon, but none of the clouds came over this neighbourhood, nor did I hear any thunder. I am inclined to think that the storm did not extend much further than this to the South or South-east, for what came here was lateral, and apparently from some heavy storm at a great distance from this.

The thermometer during the day had been up to 106° and at the commencement 90°, At the subsiding of the storm it was down to 76°.

The following logs have also reached me; and that no knowledge of the weather prevailing about the Bay at the time of the storm, should be lost, I have printed them. I shall remark upon them after summing up the evidence we have for the track of the storm.

Extract from the log of the Packet Columbia; from Calcutta towards Singapore. Civil time.

On the 24th April.—At noon in Lat. 5° 10′ N. Long. 99° 53′ East; light breezes and fine weather. At 10 P.M. very threatening to the Southward. At midnight a tremendous heavy squall, with much rain, thunder and lightning, and the wind veered suddenly to the SWestward.

25*th April.*—At 5 A.M. hard squalls, winds variable from SW. to SE. Daylight, strong breezes with a heavy head sea. Noon, strong breezes with a very heavy sea. Lat. 4° 49′ N. Long. 99° 42′ E. P.M. Moderating about midnight; wind SE. throughout.

26*th April.*—At 10 A.M. increasing again from SSE. to SE. Noon, Lat. 4° 53′ N. Long. 100° 1′ E. off Pulo Penang. Wind SSE., breeze increasing from SE. till midnight.

27*th April.*—A.M. A gale at SE. with a tremendous sea, frequently heaving the vessel on her beam ends. At Noon. Lat. 4°46′ N. Long. 99°50′ E. Towards midnight moderating from SSE. but increasing so much the next day, as to oblige the vessel to go into Penang harbour.

Extract from the Log of the Brig Pyeen Boun, from Moulmein to Madras; from Capt. Biden, Master Attendant, Madras; supposed by Nautical time.

April 29*th*, 1840.—Lat. 15° 52′ N. Long. 97° 5′ E. Hard squalls with occasional showers of rain, and a high sea running this day; wind at SSW.

April 30*th.*—Increasing heavy squalls from SSW. with lulls at intervals; a heavy sea running throughout the 24 hours; sent down topgallant masts and yards.

May 1*st.*—Hard gales from SW. with thunder, lightning, and rain, and a heavy confused sea running, breaking occasionally over the vessel. Under closed-reefed topsails.

May 2*nd.*—Increasing gales from SW., with heavy dark appearance, thunder and lightning, and a very high sea running. Split both topsails, unbent them; bent, and close-reefed two others.

May 3*d.*—Lat. 14° 32′ N. Long. 96° 30′ E.

H. C. S. Amherst. Gale of 27th April to 1st May, 1840.

The H. C. S. "Amherst" was lying at Kyook Phoo, and experienced, as by her log, nothing but squally and rainy weather at times from the 28*th April* to 1*st May.* The winds were moderate, and variable from ESE. to SE. South and SSW.

From the "Colombo Observer."

On Saturday night, 25*th April* 1840, a strong breeze of wind commenced, amounting almost to a gale—apparently the beginning of the Monsoon—accompanied, as usual, with a heavy sea and a high surf over the Bar, which has since continued. In this state of the weather a wharf jolly-boat, returning from the Persia, when crossing the Bar, was swamped, and, melancholy to relate, three persons were drowned.

The ship Recovery, Captain Johnstone, was at noon of the 28*th April* in Lat. 5° 43′ N., steering to the NNE. to round Ceylon. At noon of the 29*th,* she was in 7° 20′ N. with Westminster Abbey bearing SWbW. At noon on the 30*th* having stood north 126, miles she was in Lat. 9° 40′ N. and at noon on the 1*st May* in 11° 57′ N. having stood north 149 miles, and had fine weather throughout these days.

Barque "Cornwallis," from Bombay towards Calcutta. Civil time.

At noon on 28*th April* in Lat. 11° 50′ N., Long. Chron. 74° 48′ E. Fine weather till midnight.

29*th April.*—Midnight, strong 6 knot breeze NW. Hazy strong SSE. Daylight and to Noon heavy westerly swell. Noon Lat. 9° 14′ N. Long 75° 50′ E. increasing to sunset and midnight. Wind NW. throughout. A.M. 30*th April,* strong breezes SW. to Noon, heavy westerly swell. Noon Lat. 7° 3′ N. 78° 15′ E.; P.M. and to midnight, very heavy swell from West; wind westerly; thick hazy weather.

1*st May,*—Light 5 knot breezes at daylight, and fine weather; vessel labouring so much with the heavy westerly swell, that it is feared she may roll away her masts. Hove to to set up the rigging at Noon. Wind westerly throughout Lat. 5° 47′ N. Long. 80° 20′ E. High swell continuing till midnight, when it abated and is not mentioned on the 2*nd.*

I have next, as in the former Memoir, arranged the winds and weather experienced at Noon, Civil time, by each of the different vessels, and at the stations within the Bay of Bengal, in a tabular form; so as to afford a ready reference from the chart and diagrams, and to shew more strikingly than by detailed accounts, the remarkable contrasts which different points of the space comprised in the charts, exhibit.

Tabular View of the Hurricane in the Bay of Bengal, and at Cuttack, of 27th April to 2nd May, 1840.

Date, Civil time.	Names of Vessels and Places.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 27th April, 1840.	Nusserath Shaw,	ENE. strong breezes; dark cloudy, ...	16 2	91 21	...	...	...	Increasing sea.
	Tenasserim, ...	Easterly fresh breeze, ...	17 40	90 50	...	...	...	
	Freak, ...	Wind light; hauling to the East, ...	18 56	88 30	...	...	...	
	Flowers of Ugie,	SE. fine clear weather, ...	19 52	89 24	...	...	...	Steering to the S. Westward.
	Christopher Rawson.	SSE. light and sultry, ...	17 15	...	29.80	...	...	Heavy swell from the SW.
	Elephanta, ...	SW. to SSW. moderate and fair, ...	13 52	83 50	29.60			
	At Madras, ...	... ...	...	...	29.67	...	88	A.M. Blowing in hard gales from Westward with rain.
	Amelia Thompson,	West, moderate and fine, ...	4 14	88 18	...	...	...	
	Ganges, ...	SSW. to SW. hard gale, ...	7 10	95 18	29.60	...	...	On 26*th,* in Lat 6° 37′ N. Long. 95°56′ E. fresh gale at SSW. veering to the SW. On 27*th,* hove to under storm stay-sails. Bar. 29·50

Date, Civil time.	Names of Vessels and Places	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 28th April, 1840.	Nusserath Shaw,	ENE. a hurricane.	14 26	91 34	...	...	...	At 10 A.M. Lost mizen mast, blowing a hurricane. 3 P.M. wind shifted to South-westward.
	Vectis, ...	East fresh breezes and cloudy, ...	18 37	87 55				
	George and Mary,	Veering from SW. to East fine breeze, ...	...	...	...	...	...	At 6 P.M. Heavy bank to the SW.
	Tenasserim, ...	South-eastward, heavy gale,	...	...	...	...	...	Sea making a continued breach over the vessel, gale increasing.
	Freak, ...	Hauling to NNE. strong breeze and threatening,	17 40	88 32	...	...	...	At 6 P.M. Gale increasing rapidly from NNE.
	Flowers of Ugie,	ESE. smart breeze and clear,	19 19	88 22	29·17	...	...	Increasing breeze veering to East at 7 P.M. with very bad appearance to the SE.; standing to the SW.
	Christopher Rawson, ...	East to ESE. heavy appearance, ...	17 29	...	29·40	...	...	Running in for a pilot.
	Elephanta, ...	EbS. light winds and cloudy, ...	15 20	84 20	...	...	...	Heavy swell from SW.
	At Madras,... ...		...	...	29·66	...	89	
	Cornwallis,... ...	Fine weather, westerly breeze, ...	11 50	74 48	...			
	AmeliaThompson,	WSW. moderate, ...	4 25	87 48	...			
	Clarissa, ...	West to WSW. squalls and rain,...	7 11	87 56	...	...	...	Blowing hard and high sea, but not a gale.
	Ganges, ...	Clearing up, ...	8 7	94 33	29·80	...	...	Wind not specified.

Date, Civil time.	Names of Vessels and Places.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 29th April, 1840.	Nusserath Shaw.	SbW. squally and rain, ...	15 23	90 31	...	...	...	Fresh gales and heavy weather, with dreadful gusts of wind and squalls, sea breaking over the ship, 3 ft. water in the hold.
	Vectis, ...	*Variable!* full hurricane,	16 58	88 4	...	...	...	Full hurricane with a heavy sea, vessel on her beam ends with decks cleared, loss of top masts &c.
	George and Mary,	NNW. a mere hurricane,...	16 0	84 30	...	...	...	Hurricane, lasting for about six hours from NNW. then veering East and ESE.
	Tenasserim, ...	SE. gale, blowing hard, ...	16 32	91 2	...	...	...	Rather clear, but still blowing hard.
	Pyeen Boun, ...	SSW. hard squalls, ...	15 52	97 5	...	...	...	Showers of rain. High sea running.
	Freak, ...	SW. blowing furiously, ...	16 2	88.36	...	...	...	Hurricane since midnight.
	Flowers of Ugie,...	NE. at 10, and north at 11, and NW. at 1 P.M. heavy gales, ...	17 15	86 43	28·36*	...	...	Hove to under bare poles; heavy sea and very bad weather.
	La Belle Alliance,	NE? increasing gale and hard squalls, ...	...	...	...	...	...	Thick hazy weather, P.M. gale increasing fast, off Point Palmiras.
	Chirstopher Rawson, ...	East to ESE. in squalls, heavy gale, ...	...	...	...	...	...	SSW. 30 from floating light. Gale increasing fast, confused sea.
	Hope, L. Vessel,	Easterly strong breezes and cloudy, ...	21 26	88 07	29·65	...	81	At the inner station; 140 fathoms of cable out.
	Beacon, L. Vessel,	East, veering to NE. heavy squalls, ...	21 04	88 27	...	...	...	Threatening appearance; moderating at midnight.

* Probably by mistake see remarks—H.P.

Date, Civil Time.	Names of Vessels and Places.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 29th April, 1840. *Continued.*	Megna, P. V. ...	East and ENE. blowing hard, ...	...	...	...	...	...	At anchor Western Sea Reef; 18 fathoms, 90 fathoms cable out.
	Cauvery, P. V. ...	East to ENE. and ESE. hard squalls, ...	...	...	...	...	...	At anchor, tail of Western Sea Reef; 160 fathoms cable out.
	Coleroon, P. V. ...	NE. to ESE. hard squalls,	...	...	...	...	...	At anchor near Floating Light.
	Amelia, ...	ENE. blowing very hard,	...	...	...	...	...	Sea rising, increasing to a gale. Standing to sea with a pilot on board.
	Elephanta, ...	NE. fresh breeze and cloudy weather, ...	16 20	84 22	...	...	...	Heavy swell from the Eastward, and current to the Westward of 20 24.
	At Calcutta, ...	NE. calms and light airs,...	22 34	88 22	...	...	...	Close sultry weather and drizzling rain.
	Margaret, ...	ENE. strong breeze and rain,...	...	...	...	...	...	Between Kedgeree and Diamond Harbour.
	At Balasore, ...	NE. rain and squally, ...	21 28	87 10	29.66	...	85	
	At Pooree or Juggurnath, ...	NbE. strong wind, ...	19 48	85 45	...	...	...	Increasing breeze to midnight.
	At Madras,... ...		...	...	29.64	...	89	
	Cornwallis,... ...	NW. increasing breeze, ...	9 14	75 50				
	Clarissa, ...	Moderate on this day, ...						

Date, Civil time.	Names of Vessels and Places.	Winds and weather.	Lat. N.	Lon.E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 30th April, 1840.	Nusserath Shaw,	SE. fresh gales, ...	...	...	...	...	...	Bore up for Calcutta; heavy cross sea.
	Vectis, ...	SbW. gale continuing, ...	17 40	88 10	...	...	...	Very high sea.
	Tenasserim, ...	SSE? moderate,...	16 21	91 50	...	...	...	Becoming fine.
	Union,...	SW. strong gales and high sea, ...	14 19	82 15	...	...	...	Veering to South by midnight, and SSW. by 3 AM. 1st May. Laid to under bare poles.
	Pyeen Boun, ...	SSW. Increasing, heavy squalls, ...	...	...	...	...	...	Heavy squalls with lulls at intervals, and heavy sea; preparing for bad weather.
	Freak,...	SW. a little moderating, ...	16 41	88 0	...	...	...	
	Flowers of Ugie.	South; very heavy gales and bad weather, ...	17 48	86 53	29.11*	...	...	
	La Belle Alliance.	SSW. a violent gale with awful gusts, ...	...	...	28.60	...	...	At 11 AM. shift of wind from NEastward to SSW. Heavy sea.
	Christopher Rawson.	SSE. heavy gale, ...	20 28	...	28.90	...	...	Under bare poles in the trough of the sea.
	Hope, L. Vessel.	Strong ESE. breezes and threatening, ...	21 26	88 07	29.60	...	82	140 fathoms of cable out.
	Beacon, L. Vessel.	ESE. to East, heavy squalls and threatening weather,	21 14	88 27	...	...	...	
	Megna, P. V. ...	N. to ENE. blowing a gale,	...	...	...	...	...	At anchor Western Sea Reef 125 fathoms cable. Heavy sea.
	Cauvery, P. V. ...	Fresh gales ESE.	...	...	...	...	...	Ditto Ditto.

* Corrected.

Date, Civil time.	Names of Vessels and Places.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 30th April, 1840. *Continued.*	Coleroon, P. V. ...	ESEasterly, veering to SEbE. moderating,... ...	...	...	...	...	...	At anchor near Floating Light P.M. Gale at SEbE.
	Amelia, ...	At EbN. blowing a hard gale, ...	...	...	...	...	...	Heavy sea, wind veering to East at 6 P.M. and SE. at midnight.
	Elephanta, ...	SW. fresh breeze and cloudy,	17 46	84 28	...	...	...	A great swell from the NE. Ship labouring much.
	At CALCUTTA, ...	Light East to ESE. squalls and drizzling rain. ...	22 34	88 22	29·64	...	...	To midnight, light airs and gloomy, drizzling weather.
	Margaret, ...	ENE. threatening, ...	...	...	...	...	...	Passing Diamond Harbour.
	At Balasore, ...	NE. rain and puffy, ...	21 28	87 10	29·57	...	82	
	At Pooree or Juggurnath, ...	NE. heavy gale, ...	19 48	85 45	...	...	...	Incessant rain. Shift of wind at 8 P.M.
	At Madras, ...		...	...	29·66	...	89	
	Cornwallis, ...	NW. Strong breeze; thick hazy weather, ...	7 3	78 15	...	...	...	P.M. Very heavy swell from the Westward.
	Moira, ...	SW. smart breeze increasing	14 19	82 15	...	...	...	P.M. Increasing to strong gales at South, by midnight.
	Sarah, ...	SW. fresh breezes, ...						

Date, Civil time.	Names of Vessels and Places.	Winds and Weather.	Lat.N.	Lon.E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 1st May, 1840.	Vectis, ...	SSW. fresh gales and squally...	18 43	88 18	...	...	...	Bore up for Calcutta.
	Union, ...	SSW. and SWbS. fresh breezes hazy, ...	14 19	81 18	...	...	...	Increasing again to fresh gales SbW. and SSW. at midnight.
	Pyeen Boun, ...	SW. hard gales, thunder, lightning, and rain, ...	...	...	...	...	...	Confused sea; under close-reefed topsails.
	Freak, ...	Moderate breeze,...	17 26	87 47	...	...	...	
	Flowers of Ugie,	South, moderate and fine,...	18 23	86 58	...	...	...	
	La Belle Alliance,	Moderating from the Southward, ...	...	...	29·30	...	...	Moderating from 5 A.M.
	Christopher Rawson, ...	SSW. clearing a little, ...	...	...	...	...	...	In 16 fathoms; off Point Palmiras; ship lying helpless. P.M. Moderating.
	Hope, L. Vessel,	Moderating and veering to the Southward, ...	21 26	88 07	29·53	...	83	200 fathoms cable out. Heavy sea on.
	Beacon, L. Vessel,	SSE. heavy gale and sea,...	21 04	88 27	...	...	...	P.M. Clearing up a little, veering to SSW. at midnight.
	Megna, P.V. ...	SE. beginning to lull, ...	...	...	...	...	...	At anchor; Western Sea Reef. Sunset; wind south.
	Cauvery, ...	SWbS. fresh gale, ...	...	...	...	...	...	Driving on the Western Sea Reef with 160 fs. of cable out; at 8-30, moderate.
	Coleroon, ...	SW. gale, ...	...	...	...	...	...	At anchor as before. At 10 A.M. gale veered to SW.

Date, Civil time.	Names of Vessels and Places.	Winds and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
			° ′	° ′				
Noon. 1st May, 1840. *Continued.*	Amelia, ...	SW. gale abating, ...	...	...	...	...	...	15 miles to the south of Point Palmiras in 22 fs. Bore up.
	Elephanta, ...	SSW. moderate and hazy,	18 48	85 40	...	...	...	
	At CALCUTTA, ...	SE. to ESE. Gale with squalls.	22 34	88 22	29.47	...	...	Gale began at 6 A.M. and ended at about 9 P.M. to midnight.
	Margaret, ...	SSE. heavy gale, ...	...	...	...	...	...	At anchor Wolloobúrrya 12 miles below Calcutta.
	At Balasore, ...	South strong gusts, ...	21 28	87 10	29.43	...	81	Wind veering from NE. to South at 8 A. M.
	At Pooree or Juggurnath, ...	SW. gusts at times, ...	19 48	85 45	...	...	...	Gale abating from 4 A. M.
	At Coringa, L. H.							A heavy squall from SW. for three or four hours at 7 P. M.
	At Madras, ...		...	...	29.70	...	90	
	Cornwallis, ...	Westerly breeze and fine, ...	5 47	80 20	...	...	...	Fine weather, but tremendous swell, continuing till midnight.
	Union, ...	SSW. fresh breeze and hazy,	14 49	81 18	...	...	...	
	Sarah, ...	SbE. moderating, ...	13 25	82 47	29.56	...	...	A Gale veering from SW. to NW. and SSW. the preceding 12 hours.

We have now to show what is the evidence we possess for—

I. The formation of the vortex, and evidence for its form.

II. Its size

III. Its rate of progression.

I. *The formation of the vortex and evidence for its form.* Our evidence for the actual circle laid down on the 27*th* is, as will be subsequently seen in speaking of the centres, very imperfect; as is also that of the 28*th*, where all we know is, that it *was* a veering hurricane with the *Nusserath Shaw*, and could not be said to reach the *Freak* till the evening. Hence I have taken it to be a vortex of about 300 miles in diameter, and that the *Tenasserim's* SE. gale was a little without the circle, though really arising from the same disturbance. The diagrams, and the subsequent remarks upon the evidence by which I have placed the different centres, will render unnecessary any further detail upon this head.

In estimating the centres for the different days, I have been guided as follows,—

On the 27*th*, we have the logs of the *Nusserath Shaw* and *Tenasserim* available, and of these, the *Nusserath Shaw*—near to which vessel the centre passed on the following day at 3 P.M. when she had the shift of wind,—must of course have been the nearest to it. She had the wind steady from ENE. during the whole of the 24 hours (from noon 27*th* to noon 28*th*) an evidence that she was on the direct line of the track of the storm. She also made good, from noon to noon, a course of 100 miles S. 7° E.; while the track of the storm (by projection from the shift which she experienced, from ENE. to SW.) must have been about N. 34° W. and S. 34° E. so that we may say, without much exaggeration, that the ship travelled 100 miles, and the hurricane 180 miles almost directly towards each other! A very remarkable instance of the truth and value of the Theory of Storms, if rightly understood; for it is clear that this, which happened to a single ship, might have happened to a whole fleet! Heaving to for six hours, would have saved the owners and underwriters the heavy loss which the dismasting and return of this vessel to Calcutta entailed; and a good Barometer and Simpiesometer on board, would infallibly have indicated the coming danger in time.

The *Tenasserim* seems but just to have felt the first puffs of the storm on this day.

It will be remarked in the table for this day, that the *Ganges* in Lat. 7° 10′ N. Long. 95° 18′ E. was hove to from the day preceding, in a heavy gale blowing "from SSW. to SW." The chart does not admit my including her position, but if projected, it will be found that if the circle of the storm was completed, she was about on the opposite side of it from the *Nusserath Shaw;* and I have thus, with reference to the rate of travelling of the centre of the storm, between the 28*th* and 29*th*, assumed that it may have been about half way between them, or 290 miles from each. This would give it a circle of 580 miles on the first day, and we have no better authorities. The brief extract from the log of the *Clarissa* which vessel it will be seen, could not be far from the same latitude* on the 27*th;* being on the 28*th* in 7° 1′ N. but seven degrees further west; (her Long. being 87° 56′ E.) gives us "blowing hard from West to WSW.," so that there was probably, as in the gale of June, 1839, a Westerly and Southwesterly gale blowing across the mouth of the Bay, while the vortex was forming and travelling over from the Andamans to Cuttack. "The fine weather and SE. breezes" of the *Flowers of Ugie* and *Christopher Rawson* are exactly what should occur on the northern arm of a parabola formed by the deflection of a heavy SWesterly monsoon, setting in from the Bay against the high land of the Malay Peninsula.

For the 28*th April.* If we take the storm to have now travelled at the rate of 7 miles an hour, its centre at noon may have been about 15 to 25 miles SSE. from the *Nusserath Shaw;* since this ship had, at 3 P.M. the shift of wind from ENE. to SW. as shown by her log; so that the centre must have passed near her, to the Southward, or even over her. The *Tenasserim* at 180 miles distance, had the wind at SE. "a heavy gale" though if this was the hurricane, she should by her position, which is nearly due north of the *Nusserath Shaw's*, have had the wind at East. As there can be no doubt about the *Nusserath Shaw* having had the centre close to her at noon, and that her position was not far wrong, I have taken the point marked, 20 miles to the SE. of her, for its place at noon. The *Tenasserim* had probably her part of the storm somewhat deflected by the opening between the Andamans and Cape Negrais? or was not properly within the vortex, but in the northern arm of the parabola of the monsoon. The *Freak* and *Vectis* can scarcely be said to have felt the storm at noon on this day; the *Freak* at least not till 6 P.M., when it was a rapidly increasing gale at NNE., so that its circle may have been about 300 miles in diameter at this time.

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* Being bound from Penang to Madras, she had to make a westerly course across the Bay.

On the *29th April*, we find that the *Freak*—which vessel had had the gale rapidly increasing from NNE. at 6 P.M. on the 28th,—had it veering to NW. at midnight between the *28th* and *29th*, and to SW. by 6 A.M. or daylight; making on the whole 14 points of veering in 12 hours. At noon she had it also SW. Projecting this, it shows that the centre may have passed some 30 or 40 miles to the North-eastward of her position at midnight, which is very carefully laid down by Capt. Smoult; and that it was travelling in a N. Westerly direction. The *Flowers of Ugie* also, with a very careful log and corrected Barometer, had, we find, the storm increasing, from "squally with rain" at 4 A.M. to heaving to under bare poles at 11; the wind from East at midnight, to NE. at 10; North at 11; NW. at 1 P.M.; West at 3; SW. at 5; and South at 8 P.M. With her Barometer at 28·36, and the wind veering 16 points in the seven hours! between 10 A.M., and 5 P.M. or $2\frac{1}{4}$ points per hour; she cannot have been more than 15, or 20 miles at the utmost, from the centre. I should estimate it to have passed also to the NE. of her position. By projection I find 12 miles may have been her distance from the centre.

The log of the *Vectis*, though the centre cannot have passed far from her, is by no means so carefully kept as those of the *Freak* and *Flowers of Ugie;* so that, though I have placed her as I found it written, I am inclined to think that she may have been nearer to the *Flowers of Ugie* than she is placed on the chart.

That of the *George and Mary* presents also some anomalies, and the very remarkable one, that the wind seems to have veered as if the storm had passed close to the Southward of her. This could not have been, at all events, the same vortex. Did any division take place of the main vortex into two? which might account for this? and for the anomalies in the log of the *Vectis?* I should be unwilling, however, to suppose this, upon the very imperfect statement which has reached me, and this written by the clerk of a commercial house, who was probably not a seaman.

I have then taken the *Freak's* and *Flowers of Ugie's* positions, to determine the place of the centre this day, particularly the last vessel's, as there can be, but little doubt of her position, as she was going free till the time she hove to; and the logs of both vessels are excellent. The *Tenasserim* and *Nusserath Shaw* are apparently out of the actual circle of the storm on this day. They were perhaps beginning to feel the monsoon, which as I shall subsequently show was making its way rapidly up the Bay.

For the centre of the *30th April.* We find that according to Mr. Ewart's very graphic letter, the shift of wind took place at Pooree (Juggurnath) between 7½ P.M. and 9½ P.M., so that we may take the centre to have passed that station at 8½ P.M. of the *30th.* From noon of the *29th* to 8½ P.M. of the *30th* is 32½ hours, and the distance from the centre of the hurricane on the *29th* to Pooree, is about 165 miles. Throwing away fractions, this is about 5.1. per hour, and assuming the storm to have travelled in a straight line, we find upon measuring back for these 8½ hours, that the centre at Noon falls about 40 to 45 miles to the SW. of Pooree. This also agrees with the log of *La Belle Alliance*, which vessel had the shift of wind—and she probably passed through, or close to the centre,—at 11 A.M. This position of the centre would give the wind at the station of Pooree NEbE. Mr. Ewart's letter says NE., but a discrepancy of a point might occur even to a seaman; where compasses, weather-cocks, and vanes were not, we suppose, abundant; and where the tempest was also a sand-storm. To the North, we find the *Christopher Rawson* with the wind marked at SE. at daylight, and SSE. in the afternoon, but we have no statement of the wind exactly at noon, and in the state she is described, her observation of latitude must have been but a very indifferent one. Her place in the circle would give the wind to have been about SEbS., so that there is with her, also, a difference of a point, or a point and a half, only. The logs of the *Flowers of Ugie* with a gale at South, and *Vectis*, a gale at SbW. differ widely from what they should have been had the circles of the vortex extended so far as their positions. I have marked them on the diagrams, and now proceed to consider the probable cause of this discrepancy, and of that which we observe in the logs of the Pilot and Light

Vessels. I have adverted, in both my preceding Memoirs, to the probable effects produced by the interruption which a vortex may experience when approaching the land.

In this instance, as before, we must consider the storm as a fluid vortex, moving onwards and striking the extremity of the Coromandel range, with two openings, that of the valley of the Mahanuddee, and of the low country above the Balasore hills, through which to force its way, (see the second Chart to my first Memoir). It is difficult to suppose, and with the imperfect maps we possess, impossible to calculate, what the effect of this double interruption would be; but we may, I think, fairly attribute to it the diminished rate at which the storm appears to have travelled; its remarkable change of course during this last 24 hours; the "awful gusts" of wind described in the log of *La Belle Alliance*, and the discrepancies of some of the logs as to the direction of the wind.* We find, what is very remarkable, the *Elephanta* coming up along shore with the usual monsoon wind of the season, and "fresh breeze and cloudy weather," though, as will be seen by the diagram, she is not far from the circles of the *Christopher Rawson*, *Vectis*, *Beacon*, and *Freak*, all of them still in very bad weather. There can be no doubt about the *Elephanta's* position, since she had the land in sight. The "great swell from the NE." which I have marked in italics, is, clearly that of the tempest, which at this time was just approaching the unfortunate station of Pooree. The *Elephanta's* distance from the centre of this day is considerable, being 163 miles, which would require the vortex to have been 326 miles in diameter, to have reached her.

Taking the nearest range of elevated land to be 30 miles inland from Pooree, we may suppose that circle of the storm upon which the *Flowers of Ugie* is placed in the diagram, to have been just impinging against it at noon, and hence perhaps the sort of *flattening* of it into an irregular oval, which gives the wind on the NE. and SE. portion,—*Flowers of Ugie*, *Vectis*, and *Christopher Rawson*,—a more southerly direction; and farther to the NE. creates the irregularity of the Pilot and Light Vessel's having the wind so far to the Eastward as EbS. to ESE.; while at Balasore it is NE. and puffy. We may on all these grounds I think, assume that the vortex had become wholly irregular, except near the centre. We should remark, however, that throughout there is no *contradiction* as to the general rule for the direction in which the wind moves; for all the evidence goes to show that in the open ocean it would have been a circular storm, blowing from right to left.

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* Captain Smoult of the "Freak" in a letter subsequently sent, says "at day-light on the 30*th*, the wind had hauled round (in the space of four hours) from NNW. to ESE. then back to Southward and SW. from which quarter it blew generally, till I arrived at Point Palmiras."

For the centre of the 1*st May*, we have to consider that the monsoon wind was making its way up along the coast; but we find that at Pooree, though abating from 4 A.M., there were still gusts at times from the SW. *La Belle Alliance* was on the verge of the southern part of the storm; but the *Christopher Rawson*, close off Point Palmiras, though the weather is clearing a little, is described as lying helpless. From this vessel's position, the report from Balasore, the wind at Calcutta, and with the Pilot and Light-vessels' logs* I have judged the centre to be about where I have marked it, but we must not forget, that to extend the circle to Calcutta, will make it one of 300 miles in diameter; and that from this point, nearly half way to Calcutta, that part of the vortex nearest the earth had, since before noon of the 30*th*, met with all sorts of obstructions; since it was travelling onwards amongst the numerous ranges of hills which bound the vallies of the Mahanuddee, the Braminy, the Byturnee, and the Subunreeka rivers, to the north of Cuttack as far as Midnapore. From this cause, we cannot on this day expect any great regularity in the direction of the winds, if we project them on circles, and we must be content to take this day's evidence as before, as proof only that the general law of direction has been always followed as far as we have any evidence.

II. *The size of the vortex.*

From what has been before said, and from the chart, it will be seen that the storm appears to have been more extensive about the 27*th*, and again to have expanded on the 1*st May*, but our evidence for both these days is incomplete. That of the 27*th*, because we have but two ships by which to be guided, and that of the 1*st May*, because the only evidence we have is all on one side, and within a small arc of the circle. Hence we must say, that *it appears* to have been, while crossing the Bay a vortex of about 260 miles in diameter; and that *it may have been* larger at its commencement and termination. The Coringa hurricane of *November* 1839, is, I think, clearly enough evidence of a storm contracting in size, and this may be one of a storm first contracting and again expanding? for as, in truth, we know so little of the laws which govern these phenomena, all we can do,—all at least that I can venture to do,—is to set down the evidence carefully, with such conclusions as may strike us. Our evidence, and our conclusions will all, I trust, be weighed out and scrutinized by abler hands and heads.

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* I suspect some inaccuracy in the log of the "Beacon" for this day, but have not been able to verify my supposition.

III. *The rate of progression of the storm.*

From the centres laid down, this will be as follows:—

27*th April*	to the	28*th*	... ...	175 miles
28*th*	to	29*th*	... ...	350
29*th*	to	30*th*	... ...	113
30*th*	to	1*st May*	... ...	175

Of these we must perhaps exclude the centre of the 27*th*, for which we have but too little evidence. It is nevertheless possible, that as the track of the storm, if it was then completely formed, crosses the lofty hills of the Andamans (2500 feet high, says Hamilton) it experienced some sort of check from them on its progress? It is a curious coincidence, that after laying down, as well as I could, the centre of the 1*st May*, I found that I had given the storm 175 miles of distance from the centre of 30*th April*, which is exactly what it appears to have made on this day when crossing the Andamans! It was forcing its road over the Cuttack hills between the 30*th* and 1*st May*, as over those of the Andamans, between the 27*th* and 28*th April*. The centre of the 28*th* must be nearly correct, being so close to the *Nusserath Shaw;* as well as that of the 29*th*, for which we have the able log and chart of Captain Smoult of the *Freak;* and that of the 30*th*, which depends upon the position and shift of wind, an hour before noon, of *La Belle Alliance*, and at Pooree 7½ hours after noon, which do not admit of any great error.

	Miles ⅌ day,		Miles ⅌ hour
The four distances above stated, give an average of	203	or	8½
The last three distances give ...	213	or	9

But in both cases, the great distance travelled is that between the 28*th* and 29*th.* We cannot be far wrong in assuming this as correctly laid down, I think, when we look at the carefulness of the logs, and the remarkable rapidity with which the storm reached and passed some of the vessels? We may therefore take it as an instance of a storm in the Bay which, for this part of its track,—28*th* to 29*th*,—travelled 350 miles in 24 hours; or something more than 14½ miles per hour! *Why did it travel so slowly again, from the 29th to the 30th?*

We must take the vortex of the 28*th* and 29*th* to have been at the surface of the ocean, and, for any height with which we have to do, call it an aerial column of, say, 250 miles in diameter. Such a volume of displaced air, moving with such a velocity, must necessarily be felt at some distance preceding the line of its track. It meets as it approaches the coast with one direct obstacle, nearly at right angles to its course—the Coromandel range, and with the deflecting force of the SW. monsoon, which the *Elephanta*, we see, is bringing up along the coast. Whether these are the causes, or whether they are sufficient ones, I cannot presume to decide; they appear to me to be probable ones at least, and to account fairly enough for the decreased rate of progress and change of direction. The tracks perhaps should be laid down in curves, and not in straight lines? The facility of tracing these last, and of bringing them to fixed points at noon, have made me prefer the form of straight-lined tracks, in this and my former Memoirs, to curved ones.

On the 29*th*, the centre of the storm was 150 miles from the coast, and we may say that it was 180 miles from the first considerable range of hills; so that taking it, as is seen in the diagram, to be 260 miles in diameter, or 130 in radius, the aerial wave, which preceded it, was just about impinging on the hills at noon. How soon the re-action of this on the vortex was felt, we have no means of judging. The NE. wind experienced by the *Elephanta* on this day, when she is just on the outer verge of the storm, and which it will be noted is *against* the coast wind which she was bringing up, seems to be an effect of this atmospheric disturbance; as the "*heavy North-easterly swell*" of the 30*th* evidently is of that of the storm; the aerial wave having thus preceded the aquatic one by about 24 hours.

In tracing this storm farther inland, we have first the report from Chuprah, in Lat. 25° 46′ N. Long. 84° 46′ E. bearing about N. 8° W. 228 miles from the spot where I have placed the centre on the 1*st*

May,* which spot is in Lat. 22° N., 85° 25′ E. I have printed it, but am doubtful if it has any relation to our storm. From Mr. Ravenshaw's table, it appears, that he had a storm on the 26*th April*, another on 1*st May*, and a third on the 5*th May*, but as our centre for the 1*st May* at noon cannot be very far wrong, we can scarcely suppose that the impediments the hurricane met with can have reduced its rate of travelling so as to allow it only a motion of less than 228 miles in four days and ten hours, which is the difference between noon on the 1*st*, and 10 P.M. on the 5*th;* when, from the gale being at East, the centre must still have borne South from that station, reducing the rate of its progressive motion to perhaps 40 miles a day!

The reports from Delhi and Kurnaul, however, seem to show that the storm experienced there on the 4*th*, may have been owing to the last efforts of this one which we have been tracing. Kurnaul is in Lat. 29° 40′ N., and Long. 77° 57′ E. bearing, therefore, N. 41° W. 624 miles from our centre on the 1*st May*. From noon on the 1*st* to, say midnight, on the 4*th* are 3½ days, and this would give the distance travelled to be 178 miles per day. In the fluctuating nature of the storm, there is much of what we might, I think, expect from impulses of the kind in the neighbourhood of high mountains, and when their forces were nearly expended. If we admit these squalls in the neighbourhood of Delhi to have been part of the Cuttack storm, we shall then have traced it from the Andaman Islands to that place!

There is one more circumstance to advert to, before closing this Memoir, which I should not omit; and this is the great amount of property which, even with what we now know, has been clearly lost by ships running headlong into the storm; and this might, in all human probability, have been saved, by heaving to for twelve hours. If the tracks of the *Nusserath Shaw* from the 27*th* to the 28*th April*, of the *Freak* from the 28*th* to the 29*th*, of the *Vectis* from the 28*th* to the 29*th;* and of the *Flowers of Ugie* from the 28*th* to the 29*th*, be examined on the chart, it will be distinctly seen, that each of these vessels ran down from 100 to 150 miles to meet, or cross, the track of the hurricane! while, at the rate it was travelling, and with the infallible warning which their Barometers and the direction of the wind might have afforded them of its approach and direction, heaving to for twelve hours would have saved them all the heavy loss which they must have incurred;—to say nothing of the awful risk of foundering, which three out of the four certainly ran. If we take the amount of losses by these ships, and that by the *Marion* and others, we shall have a very large sum; the greater part of which might probably have been saved by the simple use of our knowledge of the Law of Storms. We see that they had successively the gale increasing to a storm from North to ENE. and ESE. The centre of the vortex must then have been to the Southward and SEastward of them, and their safe plan was, to heave to, for a few hours, on the starboard tack; when, being always on the right hand side of its path, they would have had the wind draw from ENE. to SE. and SSE. as we see it did with the *Nusserath Shaw* on the 30*th* and successively with all the others. The wind would then have been about at the violence of *a gale*, as it was with the *Tenasserim;* at the very time it was dismasting the *Nusserath Shaw;* and with the *George and Mary* when it was tearing the *Freak* and *Vectis* to pieces.

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* I have learnt that about this date a very severe storm was experienced in the southern and eastern parts of the Midnapore district, but no reports have reached me.

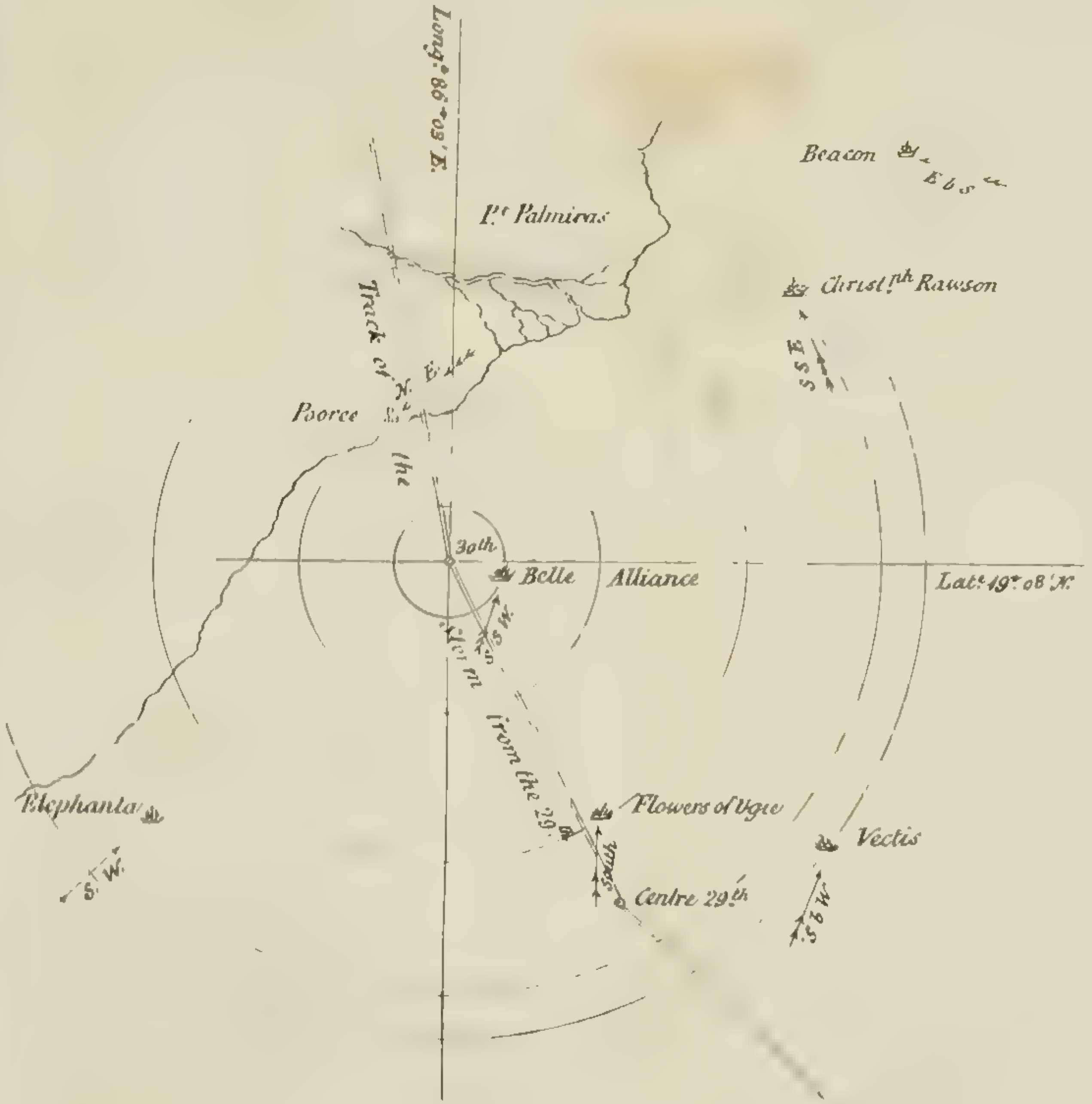
The Diagrams.

As for the 27*th* we have only two vessels on opposite sides of a circle, and no shift of wind, or other corroborative evidence, I have not thought it worth while to give a diagram for this day; nor for the 28*th*, where the centre depends partly upon the rate at which the vortex may have been travelling, and partly on the correctness of the *Nusserath Shaw's* position at noon. I have already stated why I take the circle of the hurricane not to have much exceeded 300 miles on this day.

On the 29*th* and following days, however, we have several ships, and these complications require a diagram to illustrate them, which I have accordingly, as before, given for each day.

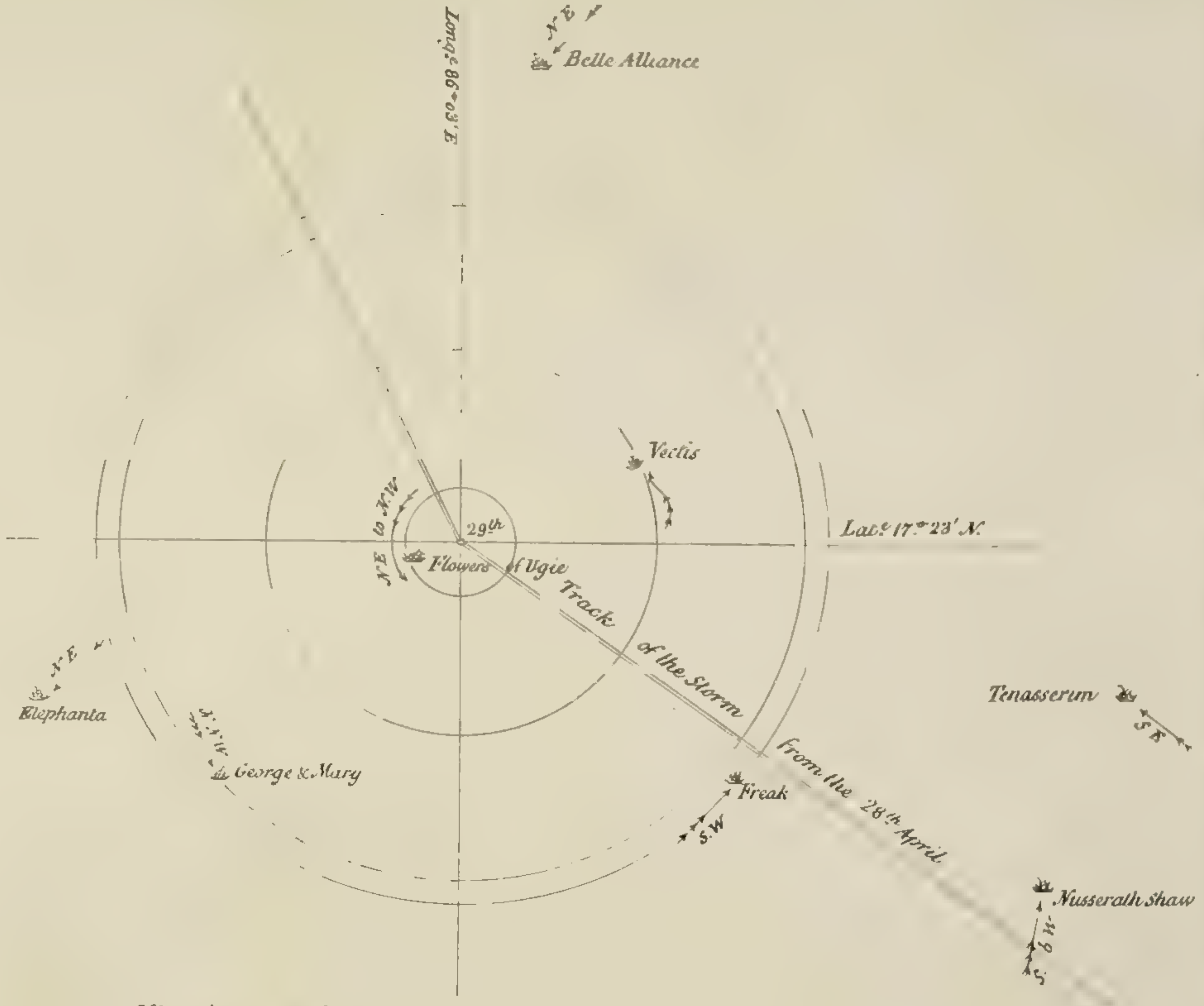
Since the foregoing pages, were placed in the hands of the printer I have been favoured by Captain Pope, of the ship *Marion*, with a copy of his protest in consequence of the dismasting of that ship. The following is a summary extract from it, altered to Civil time.

"The gale may be said to have fully commenced by noon on the 28*th April* 1840, at which time she was in Lat. 15° 10′ N. Long. 90° 15′ E., and it was then blowing a hard gale at NE. By 3 P.M. Barometer falling fast, made every preparation for bad weather. At 5h. 30′ P.M. a complete hurricane; the ship hove to on the larboard tack. A little



N° II. Diagram of the Hurricane at Noon 30th April 1840.

Outer circle 275 miles in diameter



N° I. Diagram of the Hurricane at Noon 29th April 1840

Outer circle 260 miles in diameter

Oriental Lithy Press_Calcutta.

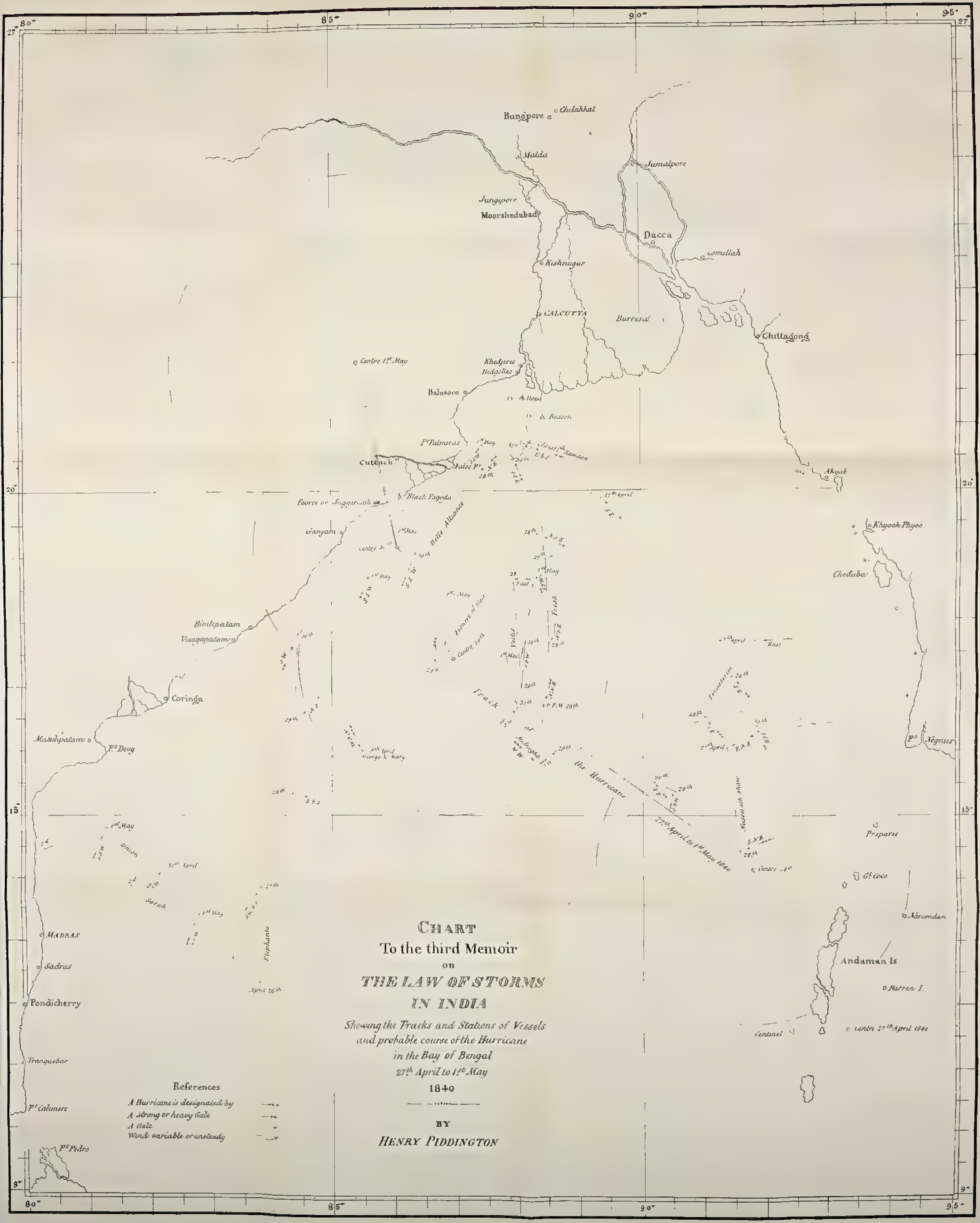


CHART
To the third Memoir
on
THE LAW OF STORMS IN INDIA

Shewing the Tracks and Stations of Vessels
and probable course of the Hurricane
in the Bay of Bengal
27th April to 1st May
1840

BY
HENRY PIDDINGTON

Oriental Lith. Press Calcutta.

To H. W. Torrens, Esq.
Secretary Asiatic Society, &c. &c.

Sir,

With reference to letter No. 17, from the Deputy Secretary of the Government of Bengal, conveying a request from the Right Honorable the Governor of Bengal, to "be furnished with full information regarding the Zoological collection alleged to have been made over to the Museum of the Society" by the late Dr. Helfer; I have the honor to report that—

1. It appears by the Society's proceedings of 10th December, 1838, that the *Ornithological* part only, of Dr. Helfer's collection was originally deposited at the Asiatic Society's rooms; the Honorable the President in Council having referred to the Society, as per Mr. Secretary Prinsep's letter, of 12th September, 1838, soliciting its advice and assistance, generally in the matter; and also as to the separation of the specimens, that could be spared.

See pp. 836, 337, of Journal Asiatic Society herewith sent No. 81 for September 1838.

2. That the division of the collection into three parts, as recommended by the Museum Committee, was made at the Museum; and that of these, one, being packed by the Curator and Assistants, was forwarded to Government for shipment to Europe, for the Honorable the Court of Directors. Dr. Helfer's part was taken away by him, at that time.

3. That of the part left for the Society, some birds were mounted, and the remainder, being 173 (duplicates) are now in the Museum.

4. These duplicates form a part of those (322 specimens in all, and mostly birds) which at our last December Meeting, I recommended being sent home to the Honorable the Court of Directors without delay; as they would be of value at home, if only for exchanging, while they had almost none here, and were necessarily fast deteriorating.

5. No collections of the classes Mammalia, Reptilia, or Pisces, from Dr. Helfer, have reached the Society, that I can learn. With the birds are three skins only of Mammalia (two monkeys and one of a squirrel), and these, no arsenic having fortunately been used in their preparation, are in a very indifferent state.

6. This remark applies equally to the birds; but it is possible that European taxidermists may succeed in mounting and repairing a very considerable number of them; and in Europe they would thus last a long time.

As. Soc. Rooms,
13*th January*. 1841.

I have, &c. &c.
H. Piddington,
Acting Curator, As. Socy's. Museum.

A copy of the foregoing paper, together with No. 81 of the Journal Asiatic Society, was forwarded for the information of the Government.

Read a letter from Dr. F. Tamnau, Jun, of Berlin, of 8th November last, containing proposals of exchanging minerals of the East, with those from Germany, Sweden, Norway, &c.

Resolved—That the following reply be made to Dr. Tamnau, *Jun.*

To Dr. F. Tamnau, *Jun.*
Berlin, Prussia.
Care of Messrs. Tamnau & Co. *Hamburgh.*

Sir, *As. Soc. Rooms, 3rd February,* 1841.

I am directed by the Asiatic Society of Bengal, to acknowledge the receipt of your letter under date 8th November 1840, and to express to you on the part of that Body, the lively feeling of satisfaction with which it finds itself in communication with you, particularly under circumstances which promise so much advantage to the Society, and prove in a most gratifying manner, the flattering consideration with which you regard it.

The exchange you propose is one which the Society would for itself gladly close with, but there are reasons which induce it to pause before concluding an arrangement, the terms of which are unexceptionable.

The Museum of the Society in the department of Mineralogy and Geology, has been from causes which it would be impossible now to enter upon, deprived of the advantages of systematic arrangement, so necessary, or rather so indispensable to its utility. Rich in specimens, it has been most unfortunately deficient in the means of arranging them, while difficulties of other kinds have interfered with the facility of classification to such a degree, as to leave the Society in doubt even as to the real extent and value of several of the collections it possesses.

Under these circumstances, I am desired to inform you, that the Society would rather propose to commence the interchange of specimens, than suffer you to do so; lest it should so happen, that the value of what it would be in a position to offer, should be incommensurate with that of the collection which you might forward.

I shall take occasion to address you again on this subject, as the gradual arrangement of the Museum proceeds, begging in the mean time to inform you, that the list you have furnished will be carefully borne in mind, and specimens, if available, put aside for transmission to you through Messrs. Allen and Co., Booksellers, Leadenhall Street, London; to whom all communications to the Asiatic Society of Bengal, may be at all times addressed.

Be assured, Sir, of the sentiments of respect, and esteem with which

I have, &c.

H. Torrens.

Read a letter from Capt. T. S. Burt, forwarding Copy of an inscription from the neighbourhood of Mount Aboo, and detailing the result of his researches there, and elsewhere in Rajpootana.

Read communications from Capt. Hutton, regarding his late visit to Killa Bheest, near Khelat, in search of inscriptions.

Read a paper from Lieut. Baird Smith, on the practical properties of the Galvanic Battery.

Read a paper from Dr. Jameison, regarding some interesting Geological discoveries.

The Secretary informed the Meeting that the communications from Capts. Burt and Hutton, Lieut. Baird Smith and Dr. Jameison, would be published in early numbers of the Journal.

Read a letter from Major RAWLINSON of Candahar, offering for publication in the Journal of the Asiatic Society, his Memoranda on the Persepolitan inscriptions, and his copies of them. It was observed by the Secretary, that anxious to give the Society the credit of first publishing the results of that distinguished antiquary's important discoveries, he would place the material, on its arrival from Candahar, at the disposal of the Society for publication in the Transactions of the Society, a course, observed the Secretary, he thought best calculated to give the record of Major RAWLINSON's priority of discovery a permanent existence, while, in order to meet that Officer's wish, that this right should be asserted as soon as possible, he would anticipate matters, by giving the letter press in the Journal, as from the Transactions, while engravings of the cuneiform inscriptions were being prepared.

Referred to the Committee of Papers.

On the proposal of the Honorable the President, Sir E. RYAN, seconded by the Honorable H. T. PRINSEP, the Officiating Secretary (H. TORRENS Esq.) was appointed Secretary to the Asiatic Society of Bengal.

For the presentations and contributions, the thanks of the Society were accorded.